



VISHAY INTERTECHNOLOGY, INC.

INTERACTIVE

data book

FREQUENCY CONTROL PRODUCTS

VISHAY DALE

VSE-DB0020-0507

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1. To navigate:
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VISHAY INTERTECHNOLOGY, INC.



DATA BOOK

FREQUENCY CONTROL PRODUCTS

Tuning Fork Crystals

Quartz Crystals

Thru-Hole Oscillators

Surface Mount Clock Oscillators

SEMICONDUCTORS

RECTIFIERS

Schottky (single, dual)
 Standard, Fast and Ultra-fast Recovery
 (single, dual)
 Clamper/Damper
 Bridge
 Superrectifier®
 Sinterglass Avalanche Diodes

SMALL-SIGNAL DIODES

Schottky and Switching (single, dual)
 Tuner/Capacitance (single, dual)
 Bandswitching
 PIN

ZENER AND SUPPRESSOR DIODES

Zener (single, dual)
 TVS (TRANSZORB®, Automotive, ESD,
 Arrays)

MOSFETs

Power MOSFETs
 JFETs

RF TRANSISTORS

Bipolar Transistors (AF and RF)
 Dual Gate MOSFETs
 MOSMICs®

OPTOELECTRONICS

IR Emitters, Detectors,
 and IR Receiver Modules
 Optocouplers and Solid-state Relays
 Optical Sensors
 LEDs and 7-Segment Displays
 Infrared Data Transceiver Modules
 Custom Products

ICs

Power ICs
 Analog Switches
 DC/DC Converters
 RF Transceivers

PASSIVE COMPONENTS

RESISTIVE PRODUCTS

Foil Resistors
 Film Resistors
 Thin Film Resistors
 Thick Film Resistors
 Metal Oxide Film Resistors
 Carbon Film Resistors
 Wirewound Resistors
 Power Metal Strip® Resistors
 Variable Resistors
 Cermet Variable Resistors
 Wirewound Variable Resistors
 Conductive Plastic Variable Resistors
 Networks/Arrays
 Non-linear Resistors
 NTC Thermistors
 PTC Thermistors
 Varistors

MAGNETICS

Inductors
 Transformers

CAPACITORS

Tantalum Capacitors
 Solid Tantalum Capacitors
 Wet Tantalum Capacitors
 Ceramic Capacitors
 Multilayer Chip Capacitors
 Disc Capacitors
 Film Capacitors
 Power Capacitors
 Heavy-Current Capacitors
 Aluminum Capacitors
 Silicon Capacitors

STRAIN GAGES AND INSTRUMENTS

PHOTOSTRESS® INSTRUMENTS

TRANSDUCERS

Load Cells
 Instruments
 Force Transducers
 Weighing Systems

Frequency Control Products

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FREQUENCY CONTROL PRODUCTS

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Crystals

QUARTZ

Quartz is formed from silicon and oxygen. It grows naturally or can be cultured in autoclaves under high pressure and heat. Most quartz used today by crystal manufacturers is cultured so that its purity and quality can be controlled. Quartz is used in Frequency Control Products because of its piezoelectric properties.

PIEZOELECTRIC EFFECT

When pressure is applied on a quartz crystal, a voltage is generated. The voltage produces a mechanical motion and vibration. The frequency of these vibrations is measured in hertz.

OPERATING MODES

A crystal can operate in a circuit in one of two modes, series or parallel.

- **SERIES RESONANCE:**

When a crystal is operated at series resonance it appears resistive and no load capacitor is required.

- **PARALLEL MODE:**

Crystals operated in this mode appear inductive in the circuit. A load capacitor must be specified for the crystal to operate at the proper frequency. Typical values of load capacitors at 18 pF, 20 pF, 30 pF or 32 pF.

FREQUENCY STABILITY

This is the allowable deviation from nominal frequency over a specified temperature range. It is expressed in ppm or % of nominal frequency.

FREQUENCY TOLERANCE

This is the maximum allowable deviation from the nominal frequency at 25 °C.

FUNDAMENTAL AND OVERTONE CRYSTALS

A crystal vibrates at many frequencies. The lowest frequency is called the fundamental mode and is usually supplied up to 30 MHz. Higher frequencies are achieved by operating the crystal at odd overtones (3rd, 5th, 7th and 9th) and tuning the circuit so the crystal operates at the designed overtone frequency.














PULLABILITY

The change in frequency (measured in ppm) for a given change in the parallel load capacitance is the pullability of the crystal. This will be specified for special applications such as VCXOs.

EQUIVALENT SERIES RESISTANCE

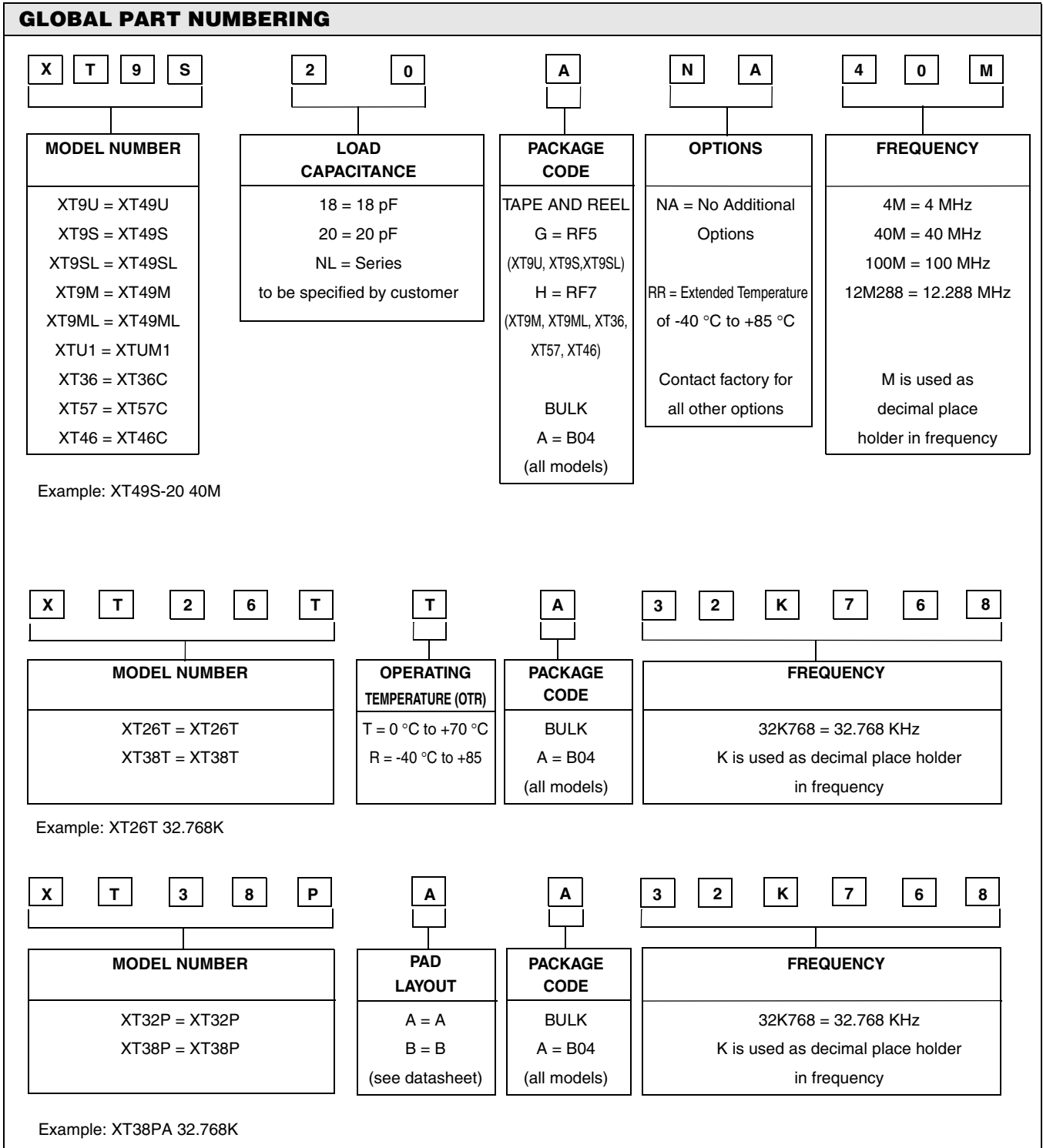
This is the resistance of the crystal measured at the series resonance frequency. The resistance measured at the parallel load resonant frequency is called the effective resistance.

Crystals

| SELECTOR GUIDE - CRYSTALS | | | | | |
|---|-------------------|-------------------------------|---------------------------------|-------------------|--|
| PRODUCT | FREQUENCY RANGE | FREQUENCY TOLERANCE (TYPICAL) | TEMPERATURE STABILITY (TYPICAL) | TEMPERATURE RANGE | KEY FEATURES |
| XT26T  | 32.768 KHz | 20 ppm | | -10 to + 60 °C | Tuning fork Low cost Sub-miniature package |
| XT38T  | 32.768 KHz | 20 ppm | | -10 to + 60 °C | Tuning fork Low cost Sub-miniature package |
| XT38P  | 32.768 KHz | 20 ppm | | -40 to + 85 °C | Tuning fork Low cost Surface mount package |
| XT32P  | 32.768 KHz | 20 ppm | | -40 to + 85 °C | Tuning fork Low cost Surface mount package |
| XT49U  | 1.8432 to 125 MHz | 30 ppm | 30 ppm | -20 to + 70 °C | Industry standard Low cost Hermetically sealed |
| XT49S  | 3.2 to 66 MHz | 30 ppm | 30 ppm | -20 to + 70 °C | Industry standard 3.5 mm profile Low cost Hermetically sealed |
| XT49SL  | 3.2 to 66 MHz | 30 ppm | 30 ppm | -20 to + 70 °C | Industry standard 2.5 mm profile Low cost Hermetically sealed |
| XT49M  | 3.2 to 66 MHz | 30 ppm | 30 ppm | -20 to + 70 °C | Industry standard 4.5 mm profile Low cost Hermetically sealed |
| XT49ML  | 3.2 to 66 MHz | 30 ppm | 30 ppm | -20 to + 70 °C | Industry standard 3.5 mm profile Low cost Hermetically sealed |
| XTUM  | 10 to 125 MHz | 10 ppm | 10 ppm | -40 to + 85 °C | Miniature package Wide frequency range |
| XT36C  | 10 to 80 MHz | 50 ppm | 50 ppm | -10 to + 70 °C | Surface mountable 1.6 mm profile |
| XT57C  | 9.8304 to 100 MHz | 30 ppm | 30 ppm | -10 to + 60 °C | Miniature package Low cost |
| XT46C  | 10 to 80 MHz | 30 ppm | 30 ppm | -10 to + 60 °C | Miniature package Low cost |



Global Part Numbering Crystals



Tuning Fork Crystal



The tuning fork type quartz crystal provides ultimate in size, performance and economic trade-offs. So it is used as a clock source in communication equipment, measuring instrument, microprocessor and other time management applications.

FEATURES

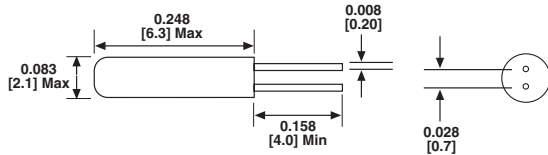
- Miniature package
- Low cost
- KHz frequency
- Tight tolerance
- 100 % Lead (Pb)-free and RoHS compliant



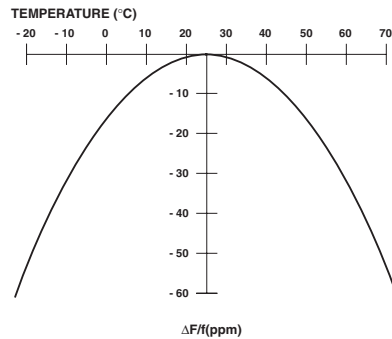
RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|---------------------|------------------------|------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F _O | | KHz | | 32.768 | |
| Frequency Tolerance | ΔF/F _O | at 25 °C | ppm | | ±20 | |
| Frequency Coefficient | K | ref to 25 °C | ppm/(Δ°C) ² | | | -0.042 |
| Operating Temperature Range | T _{OPR} | | °C | -10 | | +60 |
| Storing Temperature Range | T _{STG} | | °C | -20 | | +70 |
| Shunt Capacitance | C _O | | pF | | 0.85 | 2 |
| Motional Capacitance | C ₁ | | fF | 1 | 2 | 4 |
| Load Capacitance | CL | | pF | | 12.5 | |
| Insulation Resistance | IR | 100 V _{DC} | MΩ | 500 | | |
| Drive Level | DL | | μW | | | 1 |
| Aging (first year) | Fa | at 25 °C ± 3° C | ppm | -5.0 | | +5.0 |
| Equivalent Series Resistance(ESR) | Rs | | KΩ | | | 50 |

DIMENSIONS in inches [millimeters]



PARABOLIC TEMPERATURE CURVE



| ORDERING INFORMATION | | |
|----------------------|---------------|---------------|
| XT26T | 32.768 KHz | e2 |
| MODEL | FREQUENCY/KHz | JEDEC LEAD |
| | | FREE STANDARD |

To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

- 1) Change in Temperature (°C) = 45 - 25 = 20 °C
- 2) Change in Frequency = - 0.042 ppm*(Δ°C)
= - 0.042 ppm*(20)²
= - 16.8 ppm(max)

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|-----------------------|--------------|-----------|---|---|---|---|---|---|
| X | T | 2 | 6 | T | T | A | 3 | 2 | K | 7 | 6 | 8 |
| MODEL | | | | OPERATING TEMPERATURE | PACKAGE CODE | FREQUENCY | | | | | | |

Tuning Fork Crystal



The tuning fork type quartz crystal provides ultimate in size, performance and economic trade-offs. So it is used as a clock source in communication equipment, measuring instrument, microprocessor and other time management applications.

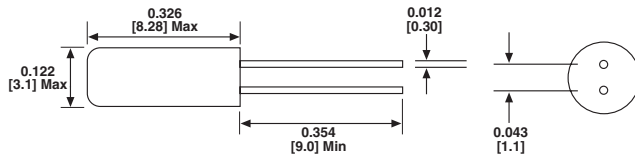
FEATURES

- Miniature package
- Low cost
- KHz frequency
- Tight tolerance
- 100 % Lead (Pb)-free and RoHS compliant

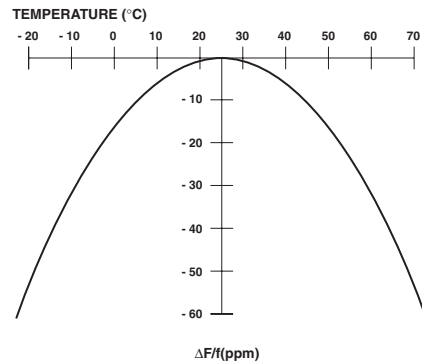


| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|----------------|--------------------|---|-------|----------|---------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F_O | | KHz | | 32.768 | |
| Frequency Tolerance | $\Delta F/F_O$ | at 25°C | ppm | | ± 20 | |
| Frequency Coefficient | K | ref to 25°C | ppm/($\Delta^\circ\text{C}$) ² | | | - 0.042 |
| Operating Temperature Range | T_{OPR} | | °C | - 10 | | + 60 |
| Storing Temperature Range | T_{STG} | | °C | - 20 | | + 70 |
| Shunt Capacitance | C_O | | pF | | 0.85 | 2 |
| Motional Capacitance | C_1 | | fF | 1 | 2 | 4 |
| Load Capacitance | CL | | pF | | 12.5 | |
| Insulation Resistance | IR | 100V _{DC} | M Ω | 500 | | |
| Drive Level | DL | | μW | | | 1 |
| Aging (first year) | Fa | at 25°C \pm 3°C | ppm | - 5.0 | | + 5.0 |
| Equivalent Series Resistance(ESR) | R _s | | K Ω | | | 35 |

DIMENSIONS in inches [millimeters]



PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45°C?

- 1) Change in Temperature (°C) = 45 - 25 = 20°C
- 2) Change in Frequency = - 0.042ppm*($\Delta^\circ\text{C}$)
= - 0.042ppm*(20)²
= - 16.8ppm(max)

| ORDERING INFORMATION | | |
|----------------------|------------------|--------------------------|
| XT38T | 32.768KHz | e2 |
| MODEL | FREQUENCY/KHz | JEDEC LEAD FREE STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|-----------------------|---|--------------|-----------|---|---|---|---|---|
| X | T | 3 | 8 | T | T | A | 3 | 2 | K | 7 | 6 | 8 |
| MODEL | | | | OPERATING TEMPERATURE | | PACKAGE CODE | FREQUENCY | | | | | |

Miniature SMD Watch Crystal



The XT38P is a 2.5 mm height plastic molded 32.768 KHz SMD crystal unit. This thermoplastic molded rugged part is perfect for your SMD applications in limited circuit space using the watch frequency.

FEATURES

- 2.5 mm height
- Industry standard footprint
- Long term stability
- Tape and reel, 3000 pcs
- 100 % Lead (Pb)-free and RoHS compliant

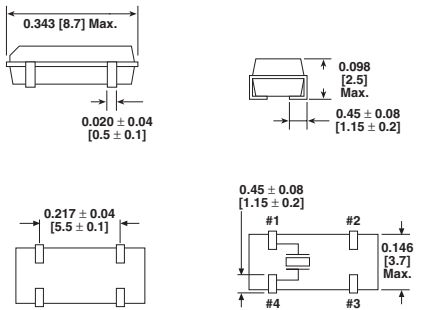


RoHS
COMPLIANT

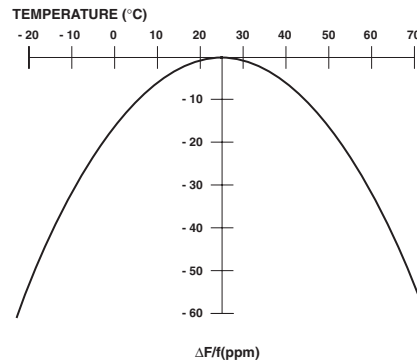
| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|-----------------------|---------------------|--------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F _O | | KHz | | 32.768 | |
| Frequency Tolerance | ΔF/F _O | at 25 °C | ppm | -20 | | +20 |
| Frequency Coefficient | K | parabolic coefficient | ppm/°C ² | -0.027 | -0.035 | -0.043 |
| Operating Temperature Range | T _{OPR} | | °C | -40 | | +85 |
| Storing Temperature Range | T _{STG} | | °C | -55 | | +125 |
| Shunt Capacitance | C _O | | pF | | 1.0 | |
| Motional Capacitance | C ₁ | | fF | | 2.0 | |
| Load Capacitance | CL | | pF | | 12.5 | |
| Insulation Resistance | IR | | MΩ | 500 | | |
| Drive Level | DL | | μW | | | 1.0 |
| Aging (first year) | Fa | at 25 °C ± 3 °C | ppm | | ±3.0 | |
| Equivalent Series Resistance(ESR) | Rs | | KΩ | | | 50 |

DIMENSIONS in inches [millimeters]

XT38PA



PARABOLIC TEMPERATURE CURVE



| ORDERING INFORMATION | | | |
|----------------------|------------|---------------|-------------------------------|
| XT38P | A | 32.768 KHz | e6 |
| MODEL | PAD LAYOUT | FREQUENCY/KHz | JEDEC Lead (Pb)-Free STANDARD |

To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

- 1) Change in Temperature (°C) = 45 - 25 = 20 °C
- 2) Change in Frequency = - 0.042 ppm*(Δ°C)
= - 0.042 ppm*(20)²
= - 16.8 ppm(max)

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|------------|--------------|-----------|---|---|---|---|---|---|
| X | T | 3 | 8 | P | A | A | 3 | 2 | K | 7 | 6 | 8 |
| MODEL | | | | PAD LAYOUT | PACKAGE CODE | FREQUENCY | | | | | | |

Surface Mount Watch Crystal



The XT32P is a cylinder type watch crystal molded in a thermoplastic housing capable of withstanding soldering re-flow processing. The XT32P is perfect for your SMD applications using the 32.768 KHz frequency. We offer two different footprints of the part to satisfy various pattern layout requirements.

FEATURES

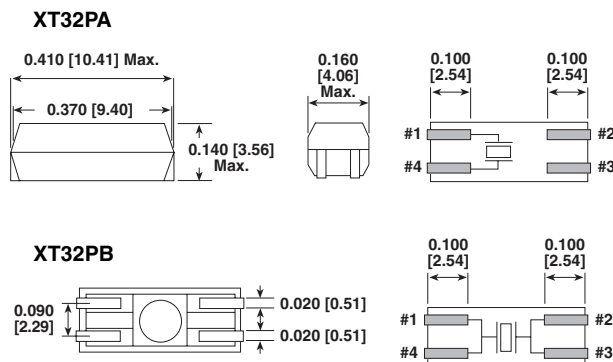
- Low profile
- Industry standard footprint
- Long term stability
- Tape and reel, 2000pcs
- 100 % Lead (Pb)-free and RoHS compliant



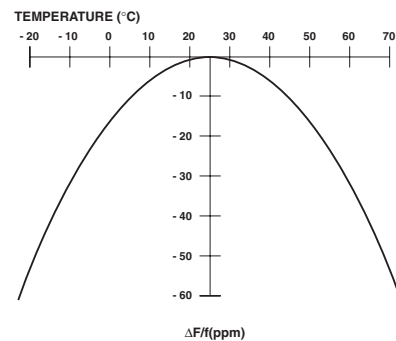
STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
|-----------------------------------|-------------------|-----------------------|---------------------|--------|---------|--------|
| Frequency Range | F _O | | KHz | | 32.768 | |
| Frequency Tolerance | ΔF/F _O | at 25 °C | ppm | -20 | | +20 |
| Frequency Coefficient | K | parabolic coefficient | ppm/°C ² | -0.027 | -0.035 | -0.043 |
| Operating Temperature Range | T _{OPR} | | °C | -40 | | +85 |
| Storing Temperature Range | T _{STG} | | °C | -55 | | +125 |
| Shunt Capacitance | C _O | | pF | | 1.0 | |
| Motional Capacitance | C ₁ | | fF | | 2.0 | 4 |
| Load Capacitance | CL | | pF | | 12.5 | |
| Insulation Resistance | IR | | MΩ | 500 | | |
| Drive Level | DL | | μW | | | 1.0 |
| Aging (first year) | Fa | at 25 °C ± 3 °C | ppm | | ±3.0 | |
| Equivalent Series Resistance(ESR) | Rs | | KΩ | | | 50 |

DIMENSIONS in inches [millimeters]



PARABOLIC TEMPERATURE CURVE



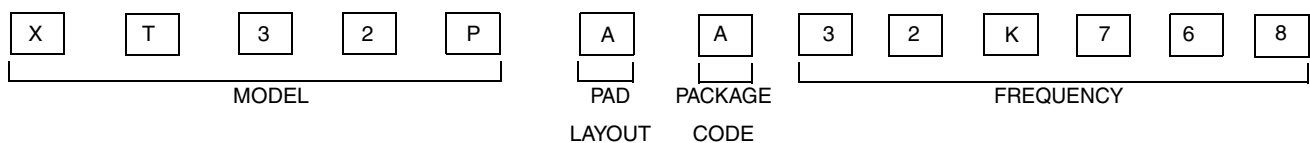
To determine frequency stability, use parabolic curvature (k).
For example: What is stability at 45 °C?

- 1) Change in Temperature (°C) = 45 - 25 = 20 °C
- 2) Change in Frequency = - 0.042 ppm*(Δ°C)
= - 0.042 ppm*(20)²
= - 16.8 ppm(max)

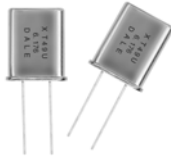
ORDERING INFORMATION

| | | | |
|--------------|----------------------|-------------------|--------------------------------------|
| XT32P | A | 32.768 KHz | e6 |
| MODEL | PAD LAYOUT A or B | FREQUENCY /KHz | JEDEC Lead (Pb)- Free STANDARD |

GLOBAL PART NUMBER



Resistance Welded Holder Type Crystal Unit



The XT49U series is an industry standard AT cut crystal housed in a HC-49U package. It is our standard resistance weld type quartz crystal.

FEATURES

- Low cost
- Industry standard
- Excellent aging
- Wide frequency range
- 'AT' cut crystal
- 100 % Lead (Pb)-free and RoHS compliant

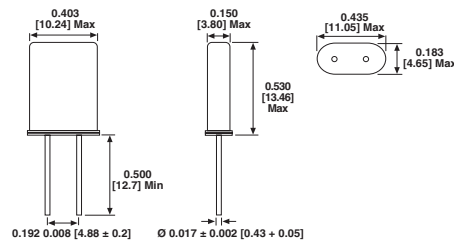


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|----------------|--------------------|-----------|----------|----------|----------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F_O | | MHz | 1.8432 | | 125 |
| Frequency Tolerance | $\Delta F/F_O$ | at 25 °C | ppm | ± 10 | ± 30 | ± 50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ± 10 | ± 30 | ± 50 |
| Operating Temperature Range | T_{OPR} | | °C | -20 | | +70 |
| Storing Temperature Range | T_{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C_O | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V_{DC} | $M\Omega$ | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | | | | |
|---|----------------------|-------------|-----------------------|----------------------|--------------------------|
| FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE | FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE |
| 1.8432 to 1.999 | 650 | Fundamental | 6.000 to 7.999 | 50 | Fundamental |
| 2.000 to 2.999 | 500 | Fundamental | 8.000 to 12.999 | 35 | Fundamental |
| 3.000 to 3.499 | 250 | Fundamental | 13.000 to 32.000 | 25 | Fundamental |
| 3.500 to 3.999 | 150 | Fundamental | 24.000 to 29.999 | 60 | 3 rd Overtone |
| 4.000 to 4.999 | 100 | Fundamental | 30.000 to 79.999 | 40 | 3 rd Overtone |
| 5.000 to 5.999 | 80 | Fundamental | 80.000 to 125.000 | 90 | 5 th Overtone |

DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | | |
|-----------------------|---|--|--|---------------------------|---|
| XT49U MODEL | R OTR Blank = Standard R = -40 °C to +85 °C | -20 LOAD Blank = Series -16 = 16 pF -20 = 20 pF -30 = 30 pF -32 = 32 pF | SP OPTIONS Blank = Standard SL = Sleeve SP = Spacer | M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | |
|--------------------|---|---|---|------|---|--------------|--------|---|-----------|---|
| X | T | 9 | U | 2 | 0 | A | N | A | 4 | M |
| MODEL | | | | LOAD | | PACKAGE CODE | OPTION | | FREQUENCY | |

Low Profile Holder Type Crystal Units



This part is a miniature AT cut strip crystal unit with a low profile package. It is with resistance weld.

FEATURES

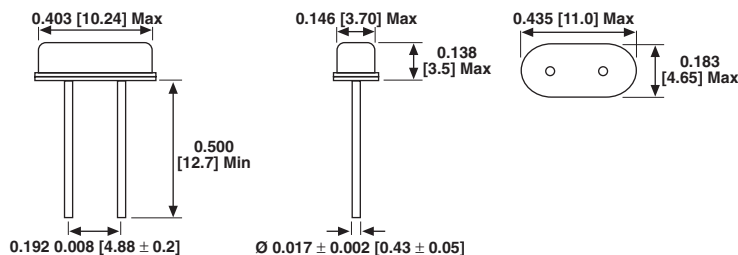
- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- 100 % Lead (Pb)-free and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|---------------------|------|-------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F ₀ | | MHz | 3.200 | | 66.000 |
| Frequency Tolerance | ΔF/F ₀ | at 25 °C | ppm | ±10 | ±30 | ±50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ±10 | ±30 | ±50 |
| Operating Temperature Range | T _{OPR} | | °C | -20 | | +70 |
| Storing Temperature Range | T _{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C ₀ | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V _{DC} | MΩ | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging (first year) | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | | | | |
|---|-------------|----------------|-----------------------|-------------|----------------|
| FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE | FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE |
| 3.200 to 4.499 | 150 | Fundamental/AT | 9.000 to 9.999 | 60 | Fundamental/AT |
| 4.500 to 5.999 | 120 | Fundamental/AT | 10.000 to 12.999 | 50 | Fundamental/AT |
| 6.000 to 6.999 | 100 | Fundamental/AT | 13.000 to 30.000 | 40 | Fundamental/AT |
| 7.000 to 7.999 | 90 | Fundamental/AT | 30.000 to 66.000 | 80 | 3rd Overtone |
| 8.000 to 8.999 | 80 | Fundamental/AT | | | |

DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | | |
|----------------------|--|---|--|---------------|-------------------------------|
| XT49S | R | -20 | SP | 12 M | e2 |
| MODEL | OTR | LOAD | OPTIONS | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | Blank = Standard R = -40 °C to +85 °C | Blank = Series -16 = 16 pF -20 = 20 pF Standard -30 = 30 pF -32 = 32 pF | Blank = Standard SP = Spacer SL = Sleeve | | |

| GLOBAL PART NUMBER | | | | | |
|--------------------|---|---|---|-----------|---|
| X | T | 9 | S | | |
| MODEL | | | | 2 | 0 |
| | | | | LOAD | |
| | | | | A | |
| | | | | PACKAGE | |
| | | | | N | A |
| | | | | OPTIONS | |
| | | | | 1 | 2 |
| | | | | FREQUENCY | |
| | | | | M | |
| | | | | CODE | |

Low Profile Holder Type Crystal Units



FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- 100 % Lead (Pb)-free and RoHS compliant



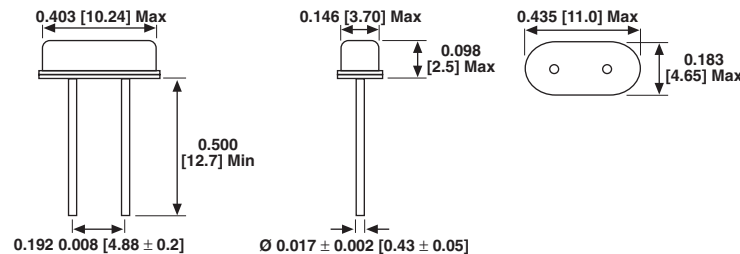
RoHS
COMPLIANT

This part is a miniature AT cut strip crystal unit with a low profile package. It is with resistance weld.

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|----------------|--------------------|-----------|----------|----------|----------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F_O | | MHz | 3.200 | | 66.000 |
| Frequency Tolerance | $\Delta F/F_O$ | at 25 °C | ppm | ± 10 | ± 30 | ± 50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ± 10 | ± 30 | ± 50 |
| Operating Temperature Range | T_{OPR} | | °C | -20 | | +70 |
| Storing Temperature Range | T_{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C_O | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V_{DC} | $M\Omega$ | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging (first year) | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | | | | |
|---|----------------------|----------------|-----------------------|----------------------|----------------|
| FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE | FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE |
| 3.200 to 4.499 | 150 | Fundamental/AT | 9.000 to 9.999 | 60 | Fundamental/AT |
| 4.500 to 5.999 | 120 | Fundamental/AT | 10.000 to 12.999 | 50 | Fundamental/AT |
| 6.000 to 6.999 | 100 | Fundamental/AT | 13.000 to 30.000 | 40 | Fundamental/AT |
| 7.000 to 7.999 | 90 | Fundamental/AT | 30.000 to 66.000 | 80 | 3rd Overtone |
| 8.000 to 8.999 | 80 | Fundamental/AT | | | |

DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | | |
|------------------------|---|---|--|------------------------------|---|
| XT49SL MODEL | R OTR Blank = Standard R = -40 °C to +85 °C | -20 LOAD Blank = Series -16 = 16 pF -20 = 20 pF Standard -30 = 30 pF -32 = 32 pF | SP OPTIONS Blank = Standard SP = Spacer SL = Sleeve | 12 M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---|------|---|---------|---------|---|-----------|---|---|
| X | T | 9 | S | L | 2 | 0 | A | N | A | 1 | 2 | M |
| MODEL | | | | | LOAD | | PACKAGE | OPTIONS | | FREQUENCY | | |
| CODE | | | | | | | | | | | | |

Low Profile SMD Type Crystal Units



This part is a miniature AT cut strip crystal unit packaged for surface mounting.

FEATURES

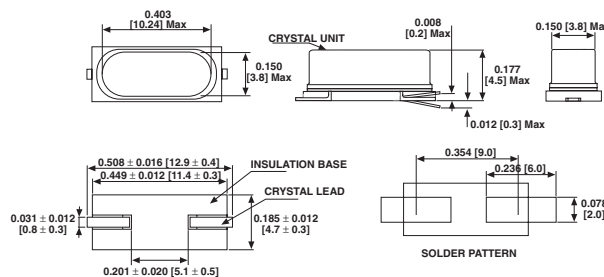
- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- Surface mount
- 100 % Lead (Pb)-free and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|---------------------|------|-------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F _o | | MHz | 3.200 | | 66.000 |
| Frequency Tolerance | ΔF/F _o | at 25 °C | ppm | ±10 | ±30 | ±50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ±10 | ±30 | ±50 |
| Operating Temperature Range | T _{OPR} | | °C | -20 | | +70 |
| Storage Temperature Range | T _{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C _o | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V _{DC} | MΩ | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | | | | |
|---|-------------|----------------|----------------------|-------------|--------------------------|
| FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE | FREQUENCY RANGE(MHZ) | MAX ESR (Ω) | MODE |
| 3.200 to 4.499 | 150 | Fundamental/AT | 9.000 to 9.999 | 60 | Fundamental/AT |
| 4.500 to 5.999 | 120 | Fundamental/AT | 10.000 to 12.999 | 50 | Fundamental/AT |
| 6.000 to 6.999 | 100 | Fundamental/AT | 13.000 to 30.000 | 40 | Fundamental/AT |
| 7.000 to 7.999 | 90 | Fundamental/AT | 30.000 to 66.000 | 80 | 3 rd Overtone |
| 8.000 to 8.999 | 80 | Fundamental/AT | | | |

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

XT49 M
MODEL

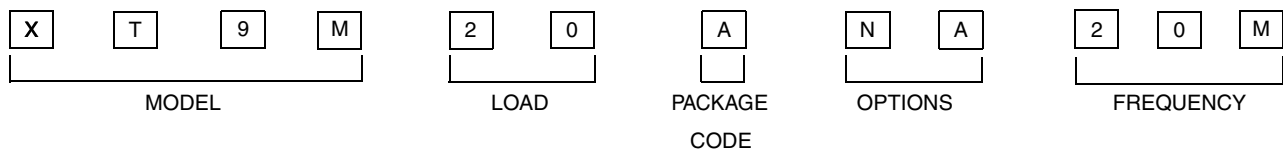
R
OTR
Blank = Standard
R = -40 °C to +85 °C

-20
LOAD
Blank = Series
-20 = 20 pF
-30 = 30 pF
-32 = 32 pF

20 M
FREQUENCY/MHZ

e2
JEDEC LEAD (PB)-
FREE
STANDARD

GLOBAL PART NUMBER



Low Profile SMD Type Crystal Units



FEATURES

- Low cost
- Industry standard
- Wide frequency range
- Excellent aging
- Surface mount
- 100 % Lead (Pb)-free and RoHS compliant



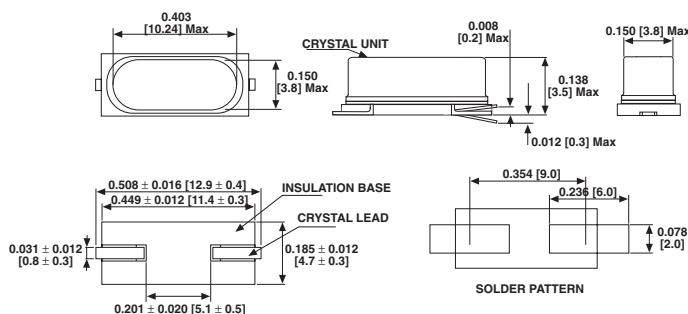
RoHS
COMPLIANT

This part is a miniature AT cut strip crystal unit packaged for surface mounting.

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|----------------|--------------------|------------|----------|----------|----------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F_o | | MHz | 3.200 | | 66.000 |
| Frequency Tolerance | $\Delta F/F_o$ | at 25 °C | ppm | ± 10 | ± 30 | ± 50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ± 10 | 30 | ± 50 |
| Operating Temperature Range | T_{OPR} | | °C | -20 | | +70 |
| Storage Temperature Range | T_{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C_o | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V_{DC} | M Ω | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | | | | |
|---|---------------------|----------------|----------------------|---------------------|--------------------------|
| FREQUENCY RANGE(MHZ) | MAX ESR(Ω) | MODE | FREQUENCY RANGE(MHZ) | MAX ESR(Ω) | MODE |
| 3.200 to 4.499 | 150 | Fundamental/AT | 9.000 to 9.999 | 60 | Fundamental/AT |
| 4.500 to 5.999 | 120 | Fundamental/AT | 10.000 to 12.999 | 50 | Fundamental/AT |
| 6.000 to 6.999 | 100 | Fundamental/AT | 13.000 to 30.000 | 40 | Fundamental/AT |
| 7.000 to 7.999 | 90 | Fundamental/AT | 30.000 to 66.000 | 80 | 3 rd Overtone |
| 8.000 to 8.999 | 80 | Fundamental/AT | | | |

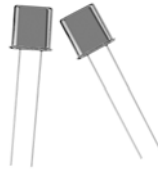
DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | |
|------------------------|---|---|----------------------------|---|
| XT49ML MODEL | R OTR Blank = Standard R = -40 °C to +85 °C | -20 LOAD Blank = Series -20 = 20 pF -30 = 30 pF -32 = 32 pF | 20 FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---|------|---|------|---------|---|-----------|---|---|
| X | T | 9 | M | L | 2 | 0 | A | N | A | 2 | 0 | M |
| MODEL | | | | | LOAD | | CODE | OPTIONS | | FREQUENCY | | |

Resistance Welded Miniature Crystal Units



The XTUM-1 crystal unit is a miniature resistance welded package that provides excellent hermetic seal and frequency aging. The frequency range till 125 Mhz and miniature size is ideal for communication equipment.

FEATURES

- Low cost
- Industry standard
- Small compact size
- Wide frequency range
- High stability
- 'AT' cut crystal
- 100 % Lead (Pb)-free and RoHS compliant


RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
|-----------------------------|----------------|--|-----------|------|---------|--------|
| Frequency Range | F_o | | MHz | 10 | | 125 |
| Frequency Tolerance | $\Delta F/F_o$ | at 25 °C | ppm | | ±10 | ±50 |
| Temperature Stability | TC | see Frequency Stability vs Temperature Range | ppm | | ±10 | ±50 |
| Operating Temperature Range | T_{OPR} | | °C | | | |
| Storing Temperature Range | T_{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C_o | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V_{DC} | $M\Omega$ | 500 | | |
| Drive Level | DL | | μW | | 100 | 500 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

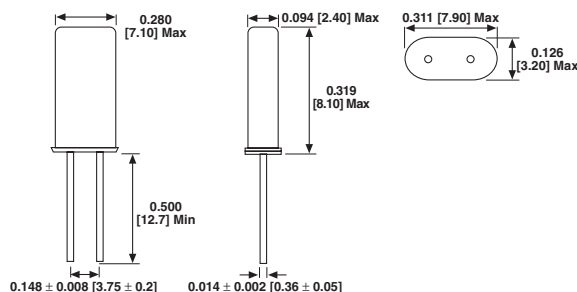
EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE)

| FREQUENCY RANGE (Mhz) | MAX ESR (Ω) | MODE |
|-----------------------|----------------------|--------------------------|
| 10.000 to 12.999 | 60 | Fundamental |
| 13.000 to 19.999 | 40 | Fundamental |
| 20.000 to 29.999 | 30 | Fundamental |
| 30.000 to 39.999 | 60 | Fundamental |
| 40.000 to 59.999 | 50 | Fundamental |
| 60.000 to 79.999 | 50 | 3 rd Overtone |
| 80.000 to 125.000 | 100 | 5 th Overtone |

FREQUENCY STABILITY VS TEMPERATURE RANGE(25 °C ± 3 °C)

| TEMPERATURE RANGE (°C) | FREQUENCY STABILITY(PPM) | | | | | |
|------------------------|--------------------------|-----|-----|-----|-----|-----|
| | ±5 | ±10 | ±15 | ±20 | ±30 | ±50 |
| 0 to 50 | x | x | x | x | x | x |
| -10 to 60 | x | x | x | x | x | x |
| -20 to 70 | | x | x | x | x | x |
| -40 to 85 | | | | x | x | x |

DIMENSIONS in inches [millimeters]



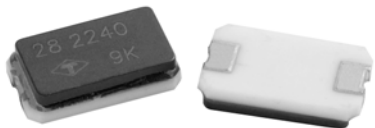
ORDERING INFORMATION

| XTUM1 MODEL | -18 LOAD | 20 M FREQUENCY/MHz | e2 JEDEC |
|-------------|----------------|--------------------|----------------|
| | Blank = Series | | Lead (Pb)-Free |
| | -32 = 32 pF | | STANDARD |
| | -18 = 18 pF | | |
| | Standard | | |

GLOBAL PART NUMBER

| | | | | | | | | | | | |
|-------|---|---|---|------|---|--------------|---------|---|-----------|---|---|
| X | T | U | 1 | 1 | 8 | A | N | A | 2 | 0 | M |
| MODEL | | | | LOAD | | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

Surface Mount Crystal



FEATURES

- Miniature size
- Wide frequency range
- Glass sealing
- Emboss taping
- Lead (Pb)-free terminations and RoHS compliant



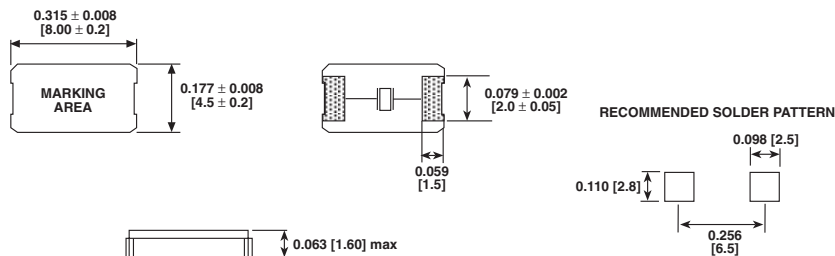
RoHS
COMPLIANT

This XT36C part is a miniature SMD crystal with 8.0 x 4.5 ceramic package and a height of 1.6 mm max. It is widely applied in notebook computer, PCMCIA and communication equipment.

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|---------------------|------|--------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F _O | | MHz | 10.000 | | 80.000 |
| Frequency Tolerance | ΔF/F _O | at 25 °C | ppm | ±30 | ±50 | ±100 |
| Temperature Stability | TC | ref to 25 °C | ppm | ±30 | ±50 | ±100 |
| Operating Temperature Range | T _{OPR} | | °C | -10 | | +70 |
| Storage Temperature Range | T _{STG} | | °C | -40 | | 85 |
| Shunt Capacitance | C _O | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V _{DC} | MΩ | 500 | | |
| Drive Level | DL | | μW | | 100 | 300 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | |
|---|-------------|--------------------------|
| FREQUENCY RANGE (MHz) | MAX ESR (Ω) | MODE |
| 10.000 to 11.999 | 80 | Fundamental |
| 12.000 to 39.999 | 50 | Fundamental |
| 40.000 to 80.000 | 70 | 3 rd Overtone |

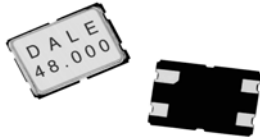
DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | |
|----------------------|---|-----------------------|--|
| XT36C MODEL | -20 LOAD Blank = Series 12 = 12 pF 16 = 16 pF 20 = 20 pF 32 = 32 pF | 24 M FREQUENCY/MHz | e4 JEDEC Lead (Pb)- Free STANDARD |

| GLOBAL PART NUMBER | | | |
|--------------------|---|-----------------|---|
| X | T | 3 | 6 |
| MODEL | | | |
| 2 | 0 | A | 2 |
| LOAD | | PACKAGE CODE | 2 |
| 4 | M | FREQUENCY | |

Quartz Crystals



The XT57C is a miniature SMD crystal with 7.0 x 5.0 ceramic package and a height of 1.1 mm max. 9.8304 MHz to 100 MHz frequency makes it widely applied in notebook computer, PCMCIA and communication equipment.

FEATURES

- Miniature size
- 1.1 mm height
- Wide frequency range
- Seam sealing
- Emboss taping
- 100 % Lead (Pb)-free and RoHS compliant


RoHS
COMPLIANT

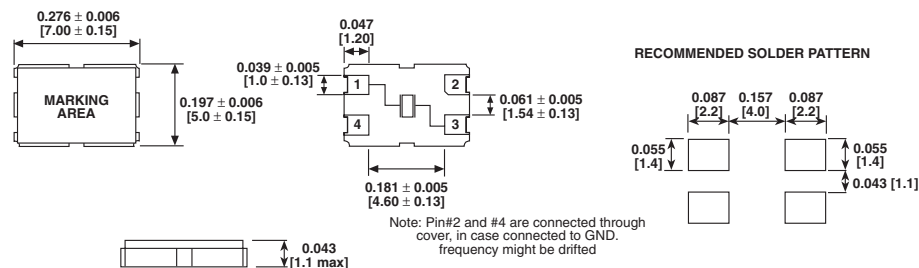
STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
|-----------------------------|----------------|--------------------|-----------|--------|---------|---------|
| Frequency Range | F_0 | | MHz | 9.8304 | | 100.000 |
| Frequency Tolerance | $\Delta F/F_0$ | at 25 °C | ppm | ±10 | ±30 | ±50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ±10 | ±30 | ±50 |
| Operating Temperature Range | T_{OPR} | | °C | -10 | | +60 |
| Storage Temperature Range | T_{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C_0 | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V_{DC} | $M\Omega$ | 500 | | |
| Drive Level | DL | | μW | | 100 | 300 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE)

| FREQUENCY RANGE (MHz) | MAX ESR (Ω) | MODE |
|-----------------------|----------------------|--------------------------|
| 9.8304 to 15.999 | 60 | Fundamental |
| 16.000 to 39.999 | 40 | Fundamental |
| 40.000 to 83.999 | 60 | 3 rd Overtone |
| 84.000 to 100.000 | 80 | 3 rd Overtone |

DIMENSIONS in inches [millimeters]



ORDERING INFORMATION

| XT57C MODEL | -20 LOAD Blank = Series 20 = 20 pF 32 = 32 pF 16 = 16 pF | 2 M FREQUENCY/MHz | e4 JEDEC Lead (Pb)- Free STANDARD |
|----------------|---|----------------------|--|
|----------------|---|----------------------|--|

GLOBAL PART NUMBER

| | | | | | | | | | |
|-------|---|---|---|------|---|-----------------|-----------|---|---|
| X | T | 5 | 7 | 2 | 0 | A | 2 | 5 | M |
| MODEL | | | | LOAD | | PACKAGE CODE | FREQUENCY | | |

Surface Mount Crystal



This part is an ultra miniature package with size of 6.0 x 3.5 x 1.0 mm. With its ceramic base and metal cover it provides the durability and reliability necessary for strenuous process like infrared and vapor phase reflow.

FEATURES

- Ultra-miniature size
- Wide frequency range
- Seam sealing
- Ceramic package
- Emboss tapping
- Reflow soldering
- 100 % Lead (Pb)-free and RoHS compliant

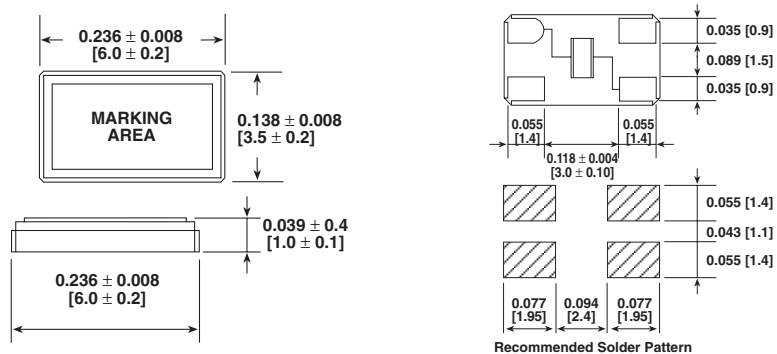


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|-------------------|---------------------|------|--------|---------|--------|
| PARAMETER | SYMBOL | CONDITION | UNIT | MIN | TYPICAL | MAX |
| Frequency Range | F _O | | MHz | 10.000 | | 80.000 |
| Frequency Tolerance | ΔF/F _O | at 25 °C | ppm | ±10 | ±30 | ±50 |
| Temperature Stability | TC | ref to 25 °C | ppm | ±10 | ±30 | ±50 |
| Operating Temperature Range | T _{OPR} | | °C | -10 | | +60 |
| Storing Temperature Range | T _{STG} | | °C | -40 | | +85 |
| Shunt Capacitance | C _O | | pF | | | 7 |
| Load Capacitance | CL | Customer Specified | pF | 10 | | Series |
| Insulator Resistance | IR | 100 V _{DC} | MΩ | 500 | | |
| Drive Level | DL | | μW | | 100 | 300 |
| Aging | Fa | at 25 °C, per year | ppm | -5.0 | | +5.0 |

| EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF VIBRATION (MODE) | | |
|---|-------------|--------------------------|
| FREQUENCY RANGE (MHZ) | MAX ESR (Ω) | MODE |
| 10.000 to 15.999 | 60 | Fundamental |
| 16.000 to 39.999 | 40 | Fundamental |
| 40.000 to 80.000 | 70 | 3 rd Overtone |

DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | |
|-----------------------|---|------------------------------|---|
| XT46C MODEL | -20 LOAD Blank = Series -20 = 20 pF Standard -32 = 32 pF | 25 M FREQUENCY/MHz | e4 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | |
|--------------------|---|--------------|-----------|
| X | T | 4 | 6 |
| MODEL | | 2 | 0 |
| | | A | |
| | | PACKAGE CODE | 2 |
| | | | 5 |
| | | | M |
| | | | FREQUENCY |



Oscillators

OSCILLATOR

An oscillator is a circuit that generates an output signal through feedback and amplification.

CLOCK OSCILLATOR

A clock oscillator is a device that establishes a reference frequency for timing purposes such as sequencing events in a computer.

LOGIC

This is the terminology used for families of active devices used in the manufacturing of clock oscillator. The most popular are TTL, HCMOS, CMOS, and ECL.

LOAD/FAN-OUT

The maximum load, specified in number of gates or in maximum load capacity, that a family of oscillators can drive is defined as the output load or driving capability.

RISE TIME

The rise time is defined as the transition time of the output waveform from low state to high state.

FALL TIME

The fall time is defined as the transition time of the output waveform from high state to low state.

SYMMERTY

Symmetry is the time the waveform is above the threshold vs. below the threshold. 50/50 is perfect symmetry.

TRI-STATE

The tri-state option allows the oscillator to be isolated from the circuit upon application of a command signal. When this feature is activated, the output goes to a high impedance state.

SUPPLY VOLTAGE

The DC input voltage necessary for oscillator operation.









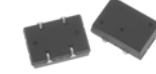

INPUT CURRENT








The amount of current consumed by an oscillator from the power supply.

FREQUENCY STABILITY (Variation of Frequency from nominal.)

This is inclusive of calibration tolerance at 25 °C, temperature change, input voltage change, load change, aging, shock, and vibration.

Oscillators

| SELECTOR GUIDE - OSCILLATORS | | | | |
|---|------------------------|----------------------------|--------------------------------|--|
| PRODUCT | FREQUENCY RANGE | FREQUENCY STABILITY | TEMPERATURE RANGE | KEY FEATURES |
| XO-53  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | TTL Compatible 14 Pin Dip |
| XO-54  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85°C) | 14 Pin Dip HCMOS/TTL Compatible Tristate Output Available |
| XO-543  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | 3.3 V Operation HCMOS/TTL Compatible Tristate Output Available |
| XO-52  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85°C) | 8 Pin Dip HCMOS/TTL Compatible Tristate Output Available |
| XO-523  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85°C) | 3.3 V Operation HCMOS/TTL Compatible Tristate Output Available |
| XO-56  | 1 to 999.9 KHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85°C) | Low Frequency HCMOS/TTL Compatible 14 Pin Dip |
| XOVC-23  | 1 to 40 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Voltage Control HCMOS/TTL Compatible |
| XOSM-52  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount HCMOS/TTL Compatible Tristate Output Available |
| XOSM-55  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 5 V Operation HCMOS/TTL Tristate Output |
| XOSM-553  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output |

| SELECTOR GUIDE - OSCILLATORS | | | | |
|---|------------------------|----------------------------|--------------------------------|--|
| PRODUCT | FREQUENCY RANGE | FREQUENCY STABILITY | TEMPERATURE RANGE | KEY FEATURES |
| XOSM-57  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount HCMOS/TTL Compatible Tristate Output |
| XOSM-573  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output |
| XOSM-572  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 2.5 V Operation HCMOS/TTL Tristate Output |
| XOSM-571  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 1.8 V Operation HCMOS/TTL Tristate Output |
| XOSM-533  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 3.3 V Operation HCMOS/TTL Tristate Output |
| XOSM-532  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 2.5 V Operation HCMOS/TTL Tristate Output |
| XOSM-531  | 1 to 100 MHz | 100/50/25 ppm | 0 to +70 °C (-40 to +85 °C) | Surface Mount 1.8 V Operation HCMOS/TTL Tristate Output |



Global Part Numbering Oscillators

| GLOBAL PART NUMBERING | | | | | | | | | | | | |
|---|---|--|---|---|--|---|---|---|---|---|---|---|
| X | O | 5 | 2 | C | T | E | L | N | A | 4 | 0 | M |
| MODEL NUMBER | FREQUENCY STABILITY | OPERATING TEMPERATURE (OTR) | | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | FREQUENCY | | | | | |
| XO53 = XO-53 XO54 = XO-54 XO34 = XO-543 XO52 = XO-52 XO32 = XO-523 XO56 = XO-56 XOVC = XOVC-23 XO5M = XOSM-52 XO63 = XOSM-533 XO62 = XOSM-532 XO61 = XOSM-531 XO57 = XOSM-57 XO37 = XOSM-573 XO27 = XOSM-572 XO17 = XOSM-571 XO55 = XOSM-55 XO35 = XOSM-553 | C = 0.01% (100 ppm) D = 0.005% (50 ppm) E = 0.0025% (25 ppm) | T = 0 °C to +70 °C R = -40 °C to +85 °C | | F = Pin 1 Open E = Disable to Tristate | TAPE AND REEL H = RF7 BULK A = B04 (X063, X062, X061) C = D06 (X057, X037, X027, XO17) D = D07 (X053, X054, X034, XO56, XOVC, X055, XO35) L = D08 (X052, X032, X05M) | NA = No Additional Options 60 = 45/55 Symmetry Contact factory for all other options | 4M = 4 MHz 40M = 40 MHz 100M = 100 MHz 12M288 = 12.288 MHz M is used as decimal place holder in frequency | | | | | |

Example: XO52CTELNA40M

Full Size Clock Oscillators TTL Compatible



The XO-53 series oscillator is TTL compatible and features fast rise/fall times with high reliability at low cost. The metal package with pin#7 case ground acts as shielding to minimize EMI radiation.

FEATURES

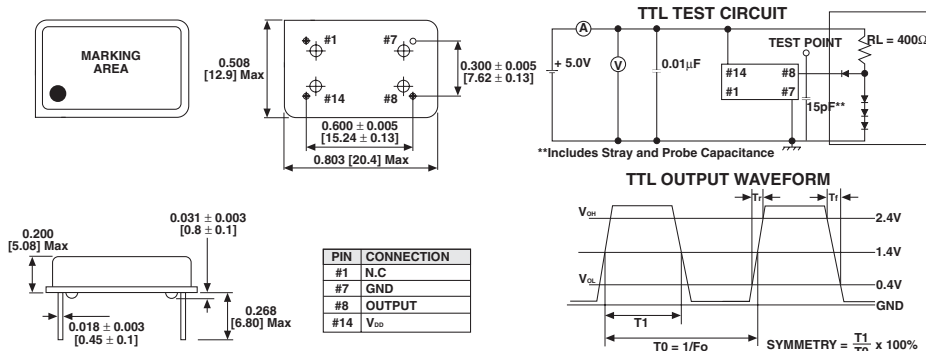
- 10TTL output load
- 14 pin fill size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- Lead (Pb)-free terminations and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|-----------|---------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XO-53 |
| Frequency Range | F_O | | 1.0 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.0 MHz to 23.999 MHz | 15 mA Max |
| | | 24.000 MHz to 69.999 MHz | 30 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | At 1.4 V | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 0.4 V ~ 2.4 V | 5 nS Max |
| Fall Time | T_f | 2.4 V ~ 0.4 V | 5 nS Max |
| Output Voltage | V_{OH} | | 2.4 V Min |
| | V_{OL} | | 0.4 V Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| Start-up Time | | T_s | 10 mS Max |

* Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

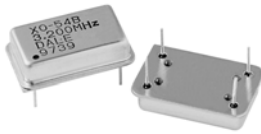
DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | |
|-----------------------|---|---|------------------------------|---|
| XO-53 MODEL | B FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | R OTR Blank = 0 °C to +70 °C R = -40 °C to +85 °C | 40 M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|--------------|---|-----------|---|---|
| X | O | 5 | 3 | C | T | D | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | PACKAGE CODE | | FREQUENCY | | |

Full Size Clock Oscillators TTL/HCMOS Compatible



FEATURES

- 14 pin full size
- Industry standard
- Wide frequency range
- Low cost
- Tri-State enable/disable
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant

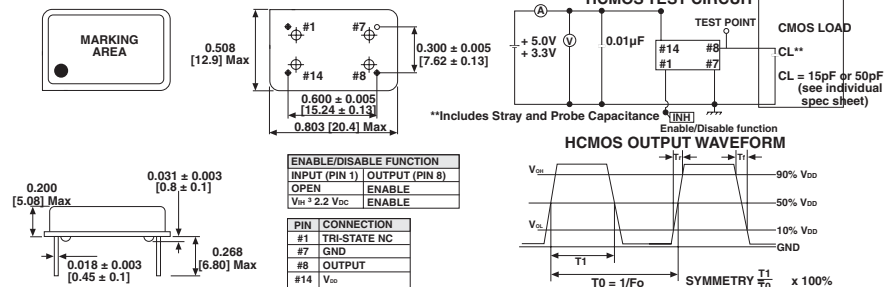


The XO-54 series oscillator is Full Size Tri-state Enable/Disable control. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------------|---|---|
| PARAMETER | SYMBOL | CONDITION | XO-54 |
| Frequency Range | F _O | | 1 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ±25 ppm, ±50 ppm, ±100 ppm |
| Operating Temperature Range | T _{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T _{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V _{DD} | | 5.0 V ± 10 % |
| Aging (First Year) | | 25 °C ± 3 °C | ±5 ppm |
| Supply Current | I _{DD} | 1 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 69.999 MHz | 40 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | 1/2 V _{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T _r | 10 % V _{DD} ~ 90 % V _{DD} | 10 nS Max |
| Fall Time | T _f | 90 % V _{DD} ~ 10 % V _{DD} | 10 nS Max |
| Output Voltage | V _{OH} | | 90 % V _{DD} Min |
| | V _{OL} | | 10 % V _{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| | HCMOS Load | | ~50 M : 50 pF |
| | | | ~70 M : 30 pF |
| Start-up Time | | T _s | ~100 M : 15 pF 10 mS Max |
| Pin 1, Tri-State Function | | | Pin 1 = H or open.... Output active at pin 8 Pin 1 = L.... High Impedance at pin 8 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



| ORDERING INFORMATION | | | | | |
|----------------------|--|--|---|---------------|-------------------------------|
| XO-54 | B | R | E | 40 M | e2 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = 0 °C to +70 °C R = -40 °C to +85 °C | Blank = Pin 1 open E = Disable or Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|---------------------|---------|---|-----------|---|---|
| X | O | 5 | 4 | C | T | E | D | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE CODE | OPTIONS | | FREQUENCY | | |

Full Size Clock Oscillators TTL/HCMOS Compatible



FEATURES

- 14 pin full size
- Industry standard
- Wide frequency range
- Low cost
- Tri-State enable/disable
- Resistance weld package
- 3.3 V
- Lead (Pb)-free terminations and RoHS compliant

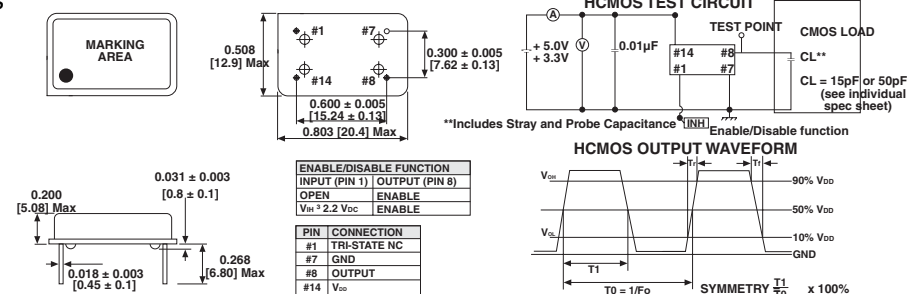


The XO-543 series is with 3.3 V power supply. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XO-543 |
| Frequency Range | F_O | | 1 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 3.3 V \pm 10 % |
| Aging (first year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1 MHz TO 23.999 MHz | 15 mA Max |
| | | 24.000 MHz TO 49.999 MHz | 20 mA Max |
| | | 50.000 MHz TO 69.999 MHz | 30 mA Max |
| | | 70.000 MHz TO 100.000 MHz | 45 mA Max |
| Output Symmetry | Sym | $1/2 V_{DD}$ | 40/60 % (45/55 % option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 8 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 8 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 5 TTL |
| | HCMOS load | | ~ 50 M : 30 pF ~ 125 M : 15 pF |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, Tri-State Function | | | Pin 1 = H or open.... Output active at pin 8 Pin 1 = L.... High Impedance at pin 8 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



ORDERING INFORMATION

| XO-543 | B | R | E | 40 M | e2 |
|--------|--|--|---|---------------|-------------------------------|
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) | Blank = 0 °C to +70 °C R = -40 °C to +85 °C | Blank = Pin 1 open E = Disable or Tristate | | |

GLOBAL PART NUMBER

| | | | | | | | | | | | | |
|-------|---|---|---|---------------------|---|--------------|---|---------|---|-----------|---|---|
| X | O | 3 | 4 | C | T | E | D | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | PACKAGE CODE | | OPTIONS | | FREQUENCY | | |

Half Size Clock Oscillators Enable/Disable



FEATURES

- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant

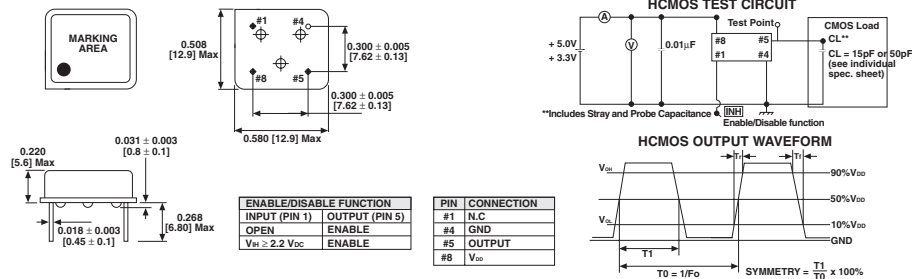


The XO-52 series oscillator is half size, has Tri-state enable/disable controlled function. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|--|--|
| PARAMETER | SYMBOL | CONDITION | XO-52 |
| Frequency Range | F_O | | 1 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | $0^\circ\text{C} \sim 70^\circ\text{C}$ ($-40^\circ\text{C} \sim +85^\circ\text{C}$ option) |
| Storage Temperature Range | T_{STG} | | $-55^\circ\text{C} \sim +125^\circ\text{C}$ |
| Power Supply Voltage | V_{DD} | | $5.0\text{ V} \pm 10\%$ |
| Aging (First Year) | | $25^\circ\text{C} \pm 3^\circ\text{C}$ | ± 5 ppm |
| Supply Current | I_{DD} | 1 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 69.999 MHz | 40 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | At $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | $20\% V_{DD} \sim 80\% V_{DD}$ | 10 nS Max |
| Fall Time | T_f | $80\% V_{DD} \sim 20\% V_{DD}$ | 10 nS Max |
| Output Voltage | V_{OH} | | $90\% V_{DD}$ Min |
| | V_{OL} | | $10\% V_{DD}$ Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| | HCMOS Load | | $\sim 50\text{ M} : 50\text{ pF}$ |
| | | | $\sim 70\text{ M} : 30\text{ pF}$ |
| Start-up Time | | T_s | $\sim 100\text{ M} : 15\text{ pF}$ 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5 |

*Include: 25°C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | | |
|----------------------|-------------------------------|--|---------------------------|---------------|-------------------------------|
| XO-52 | B | R | E | 40 M | e2 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHZ | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) | Blank = 0°C to $+70^\circ\text{C}$ | Blank = Pin 1 open | | |
| | A = 0.005 % (50 ppm) | R = -40°C to $+85^\circ\text{C}$ | E = - Disable to Tristate | | |
| | B = 0.01 % (100 ppm) Standard | | | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|----------------|--------------|---------|-----------|---|---|
| X | O | 5 | 2 | C | T | E | L | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | FREQUENCY | | |

Half Size Clock Oscillators Enable/Disable



The XO-523 series oscillator is half size, has Tri-state enable/disable controlled function, and is with a 3.3 V power supply voltage. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

FEATURES

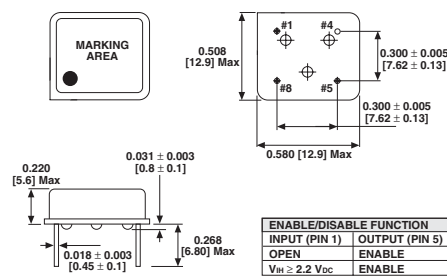
- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 3.3 V
- Lead (Pb)-free terminations and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XO-523 |
| Frequency Range | F_O | | 1 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 3.3 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1 MHz to 23.999 MHz | 15 mA Max |
| | | 24.000 MHz to 49.999 MHz | 20 mA Max |
| | | 50.000 MHz to 69.999 MHz | 30 mA Max |
| | | 70.000 MHz to 100.000 MHz | 45 mA Max |
| Output Symmetry | Sym | At 1/2 V_{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 20 % V_{DD} ~ 80 % V_{DD} | 8 nS Max |
| Fall Time | T_f | 80 % V_{DD} ~ 20 % V_{DD} | 8 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 5 TTL |
| | HCMOS Load | | ~50 M : 30 pF ~125 M : 15 pF |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5 |

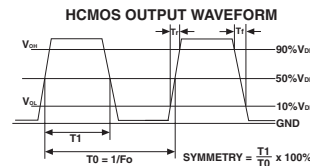
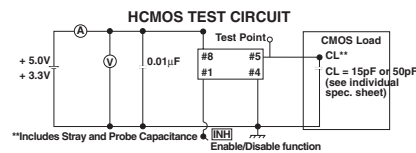
*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



| ENABLE/DISABLE FUNCTION | |
|--------------------------|----------------|
| INPUT (PIN 1) | OUTPUT (PIN 5) |
| OPEN | ENABLE |
| $V_{IH} \geq 2.2 V_{CC}$ | ENABLE |

| PIN | CONNECTION |
|-----|------------|
| #1 | N.C |
| #4 | GND |
| #5 | OUTPUT |
| #8 | V_{DD} |



ORDERING INFORMATION

| XO-523 MODEL | B FREQUENCY STABILITY | R OTR | E ENABLE/DISABLE | 40 M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |
|--------------|--|---|---|--------------------|----------------------------------|
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) | Blank = 0 °C to +70 °C R = -40°C to +85 °C | Blank = Pin 1 open E = - Disable to Tristate | | |

GLOBAL PART NUMBER

| | | | | | | | | | | | | |
|-------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 3 | 2 | C | T | E | L | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

Full Size Clock Oscillators TTL/HCMOS Compatible



The XO-56 series oscillator is Full Size for low frequency. The metal package with pin #7 case ground acts as shielding to minimize EMI radiation.

FEATURES

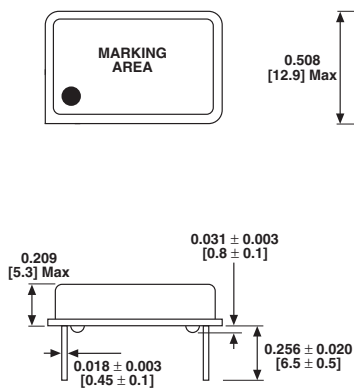
- 14 pin full size
- Industry standard
- Low frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free terminations and RoHS compliant



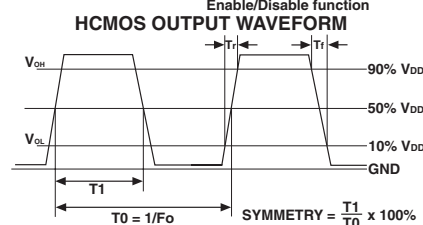
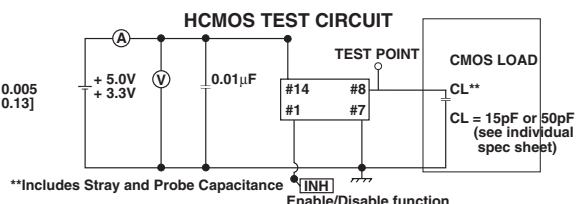
| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XO-56 |
| Frequency Range | F_O | | 1.0 kHz ~ 999.9 kHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | \pm 5 ppm |
| Supply Current | I_{DD} | 1.0 kHz to 999.9 kHz | 10 mA Max |
| Output Symmetry | Sym | $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 10 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 10 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| | HCMOS Load | | 15 pF |
| Start-up Time | | T_s | 10 mS Max |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in millimeters



| PIN | CONNECTION |
|-----|------------|
| #1 | NC |
| #7 | GND |
| #8 | OUTPUT |
| #14 | V_{DD} |



| ORDERING INFORMATION | | | | |
|----------------------|--|--|------------------------|---|
| XO-56 MODEL | B FREQUENCY STABILITY AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | R OTR Blank = 0 °C to +70 °C R = -40 °C to +85 °C | 256 K FREQUENCY/kHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|------------------------|-----|-----------------|---------|---|-----------|---|---|---|
| X | O | 5 | 6 | C | T | D | N | A | 2 | 5 | 6 | K |
| MODEL | | | | FREQUENCY STABILITY | OTR | PACKAGE CODE | OPTIONS | | FREQUENCY | | | |



Full Size Voltage Controlled Crystal Oscillators



The XOVC-23 is a full size voltage controlled crystal oscillator designed primarily for use in phase locked loops, phase shift keying and other tele-communication applications such as ADSL and cable modem.

FEATURES

- 14 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- Lead (Pb)-free terminations and RoHS compliant



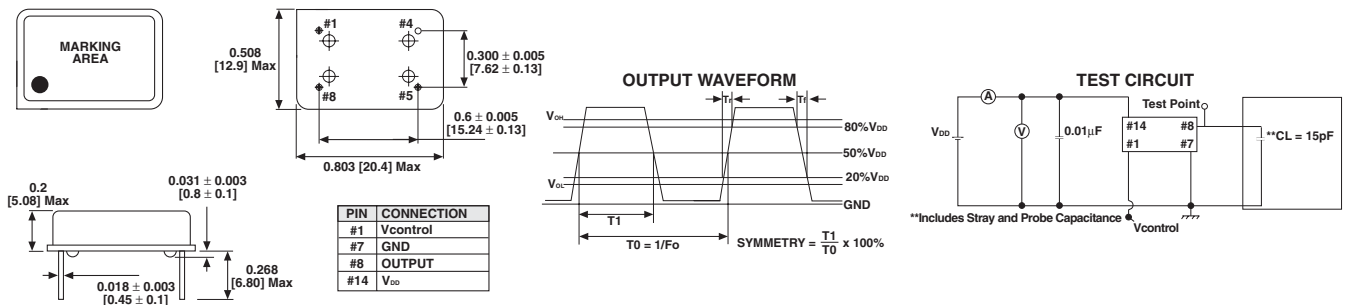
RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | XOVC-23 |
|-----------------------------|-----------|-------------------------------|---------------------------------------|
| Frequency Range* | F_O | | 1 MHz ~ 40.00 MHz |
| Frequency Calibration | | At 25 °C | ±15 ppm |
| Temperature Stability | | Over T_{OPR} | ±15 ppm, ±25 ppm, ±50 ppm |
| Stability vs. power change | | $V_{DD} \pm 5\%$ | ±5 ppm |
| Stability vs. load change | | 15 pF ± 10 % | ±3 ppm |
| Pullability | | Over Control Voltage Range | ±50 ppm, ±100 ppm, ± 200 ppm |
| Control Voltage Range | | | 0.5 ~ 4.5 V |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V ± 5 % |
| Aging (First Year) | | 25 °C ± 3 °C | ±5 ppm |
| Supply Current | I_{DD} | 1.000 MHz to 23.999 MHz | 15 mA Max |
| | | 24.000 MHz to 40.000 MHz | 25 mA Max |
| Output Symmetry | Sym | At $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 20 % V_{DD} ~ 80 % V_{DD} | 10 nS Max |
| Fall Time | T_f | 80 % V_{DD} ~ 20 % V_{DD} | 10 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | | | 15 pF Max |
| Start-up Time | | T_s | 10 mS Max |

*Frequency over 40.000 MHz, please consult factory

DIMENSIONS in inches [millimeters]

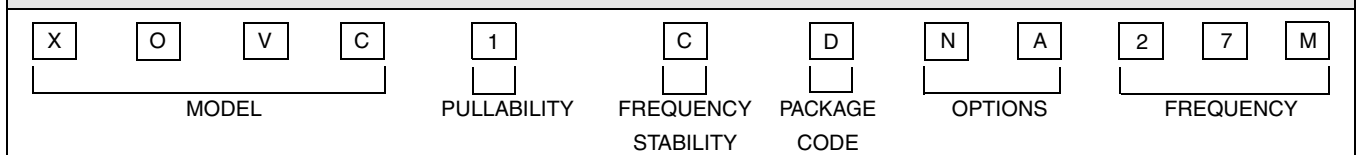


ORDERING INFORMATION

| XOVC-23 MODEL | B FREQUENCY STABILITY | -1 PULLABILITY | 27 M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |
|---------------|--|---|--------------------|----------------------------------|
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) | -1 = ±100 ppm -2 = ±200 ppm -3 = ±500 ppm | | |

Note: Contact factory for other models, frequencies, stabilities and temperature ranges.

GLOBAL PART NUMBER



Half Size Clock Oscillator Enable/Disable



FEATURES

- Tri-state enable/disable
- 8 pin half size
- Industry standard
- Wide frequency range
- Low cost
- Resistance weld package
- 5 V
- Lead (Pb)-free and RoHS compliant

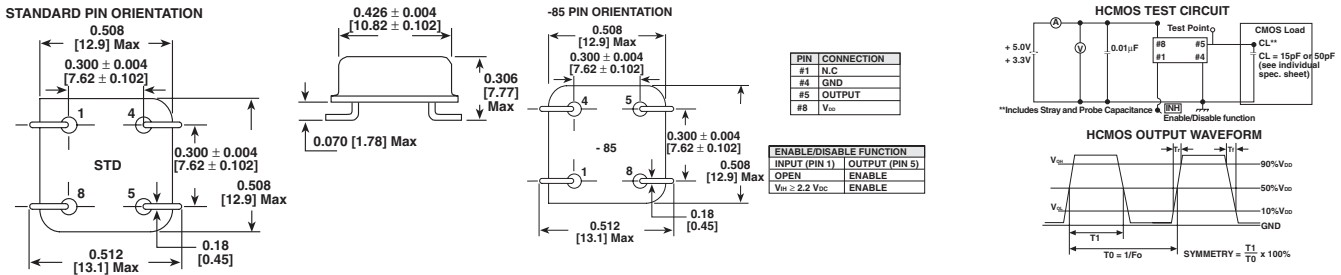


The XOSM-52 series oscillator is half size, has Tri-state enable/disable controlled function. The metal package with pin#4 case ground acts as shielding to minimize EMI radiation.

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XOSM-52 |
| Frequency Range | F_O | | 1 MHz ~ 100.00 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature Range | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 69.999 MHz | 40 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | At $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 20 % V_{DD} ~ 80 % V_{DD} | 10 nS Max |
| Fall Time | T_f | 80 % V_{DD} ~ 20 % V_{DD} | 10 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| | HCMOS Load | | ~ 50 M : 50 pF |
| | | | ~ 70 M : 30 pF |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open... Output active at pin 5 Pin 1 = L... high impedance at pin 5 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

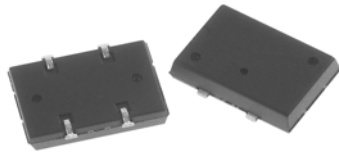
DIMENSIONS in inches [millimeters]



| ORDERING INFORMATION | | | | | |
|----------------------|--|---|---|---------------|-------------------------------|
| XOSM-52 | B | R | E | 40 M | e2 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = 0 °C to 70 °C R = -40 °C to +85 °C | Blank = Pin 1 open E = - Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 5 | M | C | T | E | L | N | A | 4 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

J - Lead Plastic Clock Oscillators



The XOSM-55 series oscillator is a J-Lead plastic tri-state enable/disable controlled clock oscillator with a 5.0 V power supply voltage. The J-Lead configuration and high resistance soldering temperature make it ideal for surface mount production.

FEATURES

- J-Lead plastic surface mount
- SG-615 compatible
- Wide frequency range
- Low cost
- Tri-state enable/disable
- 5.0 V power supply
- Lead (Pb)-free terminations and RoHS compliant

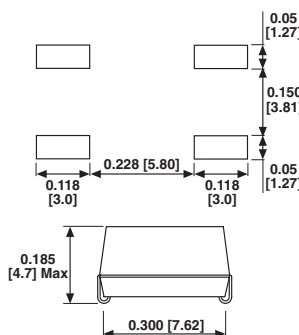
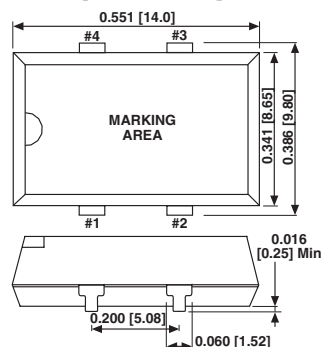


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-55 |
| Frequency Range | F_O | | 1 MHz ~ 66.667 MHz |
| Frequency Stability* | | | ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V \pm 1 0% |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.000 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 66.667 MHz | 40 mA Max |
| Output Symmetry | Sym | At 0.5 V_{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 8 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 7 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 LSTTL |
| | HCMOS Load | | 30 pF Max |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



| PIN | CONNECTION |
|-----|--------------|
| #1 | TRI-STATE/NC |
| #2 | GND |
| #3 | OUTPUT |
| #4 | V_{DD} |

| ENABLE/DISABLE FUNCTION | |
|-------------------------|--------------|
| INPUT(PIN1) | OUTPUT(PIN3) |
| OPEN | ENABLE |
| $V_{IH} \geq 2.2V_{DD}$ | ENABLE |
| $V_{IL} \leq 0.8V_{DD}$ | DISABLE |

***note: A 0.01uF bypass capacitor should be placed between V_{DD} (Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|----------------------|---|--|-------------------------|---------------|-------------------------------|
| XOSM-55 | B | R | E | 50 M | e2 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|---------------------|---------|---|-----------|---|---|
| X | O | 5 | 5 | C | T | E | D | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE CODE | OPTIONS | | FREQUENCY | | |

Surface Mount Oscillator



The XOSM-553 series oscillator is a J-Lead plastic tri-state enable/disable controlled clock oscillator with a 3.3 V power supply voltage. The J-Lead configuration and high resistance soldering temperature make it ideal for surface mount production.

FEATURES

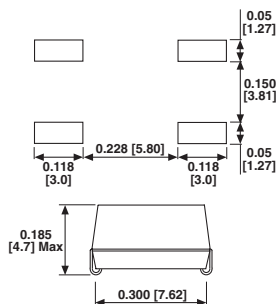
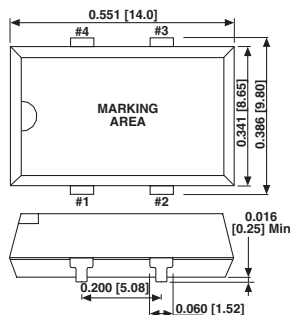
- J-Lead plastic surface mount
- SG-615 compatible
- Wide frequency range
- Low cost
- Tri-state enable/disable
- 3.3 V power supply
- Lead (Pb)-free terminations and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-553 |
| Frequency Range | F_O | | 1 MHz ~ 66.667 MHz |
| Frequency Stability* | | | ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 3.3 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.000 MHz to 23.999 MHz | 15 mA Max |
| | | 24.000 MHz to 49.999 MHz | 20 mA Max |
| | | 50.000 MHz to 66.667 MHz | 30 mA Max |
| Output Symmetry | Sym | At 1/2 V_{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 5 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 5 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 LSTTL |
| | HCMOS Load | | 15 pF Max |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



| PIN | CONNECTION |
|-----|--------------|
| #1 | TRI-STATE/NC |
| #2 | GND |
| #3 | OUTPUT |
| #4 | V_{DD} |

| ENABLE/DISABLE FUNCTION | |
|-------------------------|--------------|
| INPUT(PIN1) | OUTPUT(PIN3) |
| OPEN | ENABLE |
| $V_{IH} \geq 2.2V_{oc}$ | ENABLE |
| $V_{IL} \leq 0.8V_{oc}$ | DISABLE |

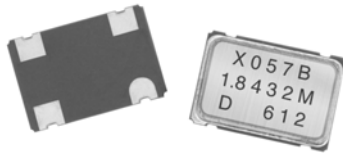
***note: A 0.01 μ F bypass capacitor should be placed between V_{DD} (Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|-------------------------|---|---|---|------------------------------|--|
| XOSM-53 MODEL | B FREQUENCY STABILITY A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | R OTR Blank = Standard R = -40 °C to +85 °C | E ENABLE/DISABLE E = Disable to Tristate | 50 M FREQUENCY/MHz | e2 JEDEC Lead (Pb)-Free STANDARD |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 3 | 5 | C | T | E | D | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |



Surface Mount Oscillator



The XOSM-57 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.6 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- TTL/HCMOS compatible
- Tape and Reel
- IR Re-flow
- 5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

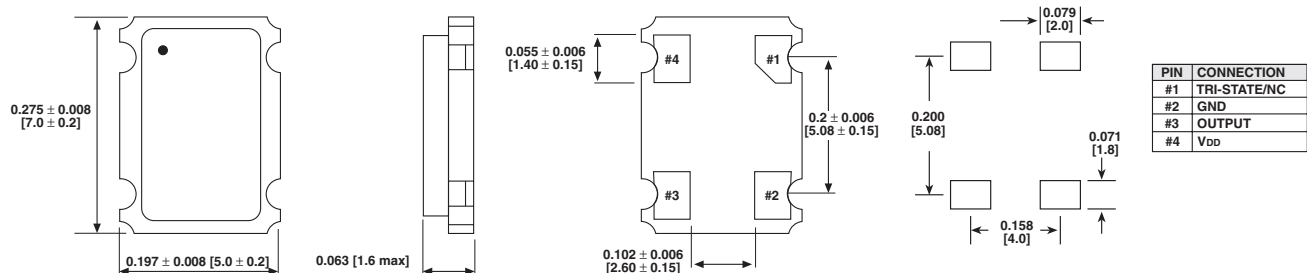


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-57 |
| Frequency Range | F_O | | 1 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 5.0 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.000 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 69.999 MHz | 40 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | At $\frac{1}{2} V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 5 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 5 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | TTL Load | | 1 ~ 10 TTL |
| | HCMOS Load | | 30 pF Max |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 μ F bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|----------------------|--|--|-------------------------|---------------|-------------------------------|
| XOSM-57 | B | R | E | 50 M | e4 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|----------------|--------------|---------|---|-----------|---|
| X | O | 5 | 7 | C | T | E | C | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | |

Surface Mount Oscillator



The XOSM-573 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.6 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- TTL/HCMOS compatible
- Tape and Reel
- IR Re-flow
- 3.3 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

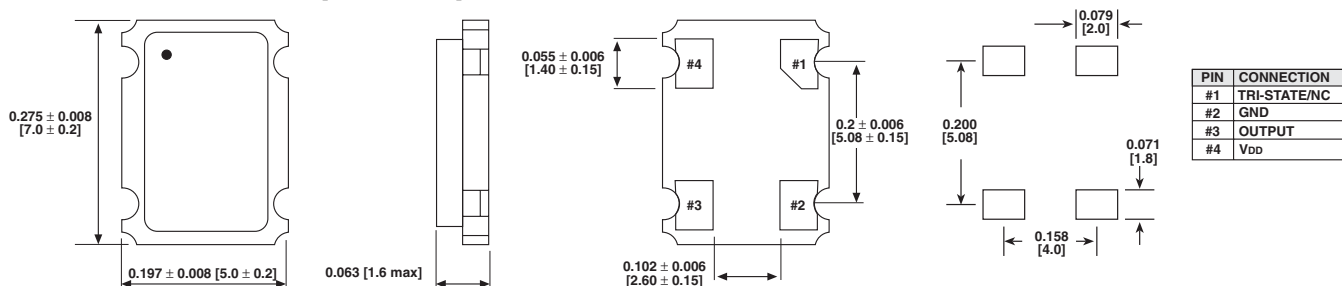


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------------|---|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-573 |
| Frequency Range | F _O | | 1 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ±25 ppm, ±50 ppm, ±100 ppm |
| Operating Temperature Range | T _{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T _{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V _{DD} | | 3.3 V ± 10 % |
| Aging (First Year) | | 25 °C ± 3 °C | ±5 ppm |
| Supply Current | I _{DD} | 1.000 MHz to 23.999 MHz | 20 mA Max |
| | | 24.000 MHz to 49.999 MHz | 30 mA Max |
| | | 50.000 MHz to 69.999 MHz | 40 mA Max |
| | | 70.000 MHz to 100.000 MHz | 60 mA Max |
| Output Symmetry | Sym | At 1/2 V _{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T _r | 10 % V _{DD} ~ 90 % V _{DD} | 5 nS Max |
| Fall Time | T _f | 90 % V _{DD} ~ 10 % V _{DD} | 5 nS Max |
| Output Voltage | V _{OH} | | 90 % V _{DD} Min |
| | V _{OL} | | 10 % V _{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max |
| Start-up Time | | T _s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 µF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|----------------------|--|--|-------------------------|---------------|-------------------------------|
| XOSM-573 | B | R | E | 50 M | e4 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 3 | 7 | C | T | E | C | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

Surface Mount Oscillator



The XOSM-572 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.5 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

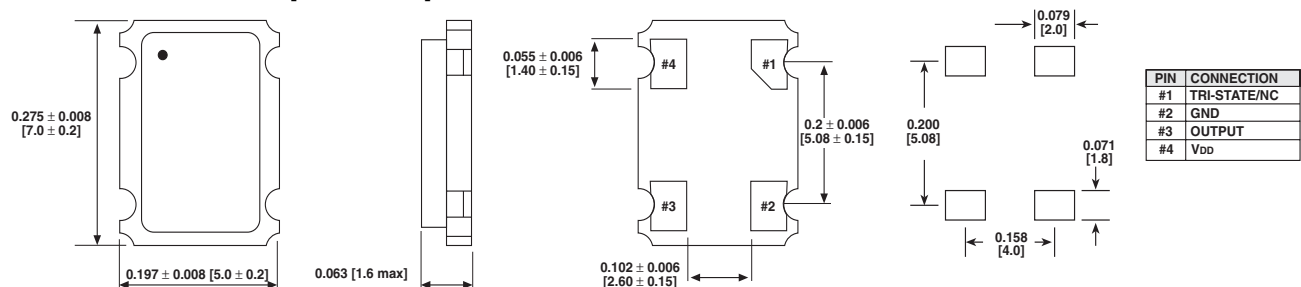
- Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 2.5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|---|
| PARAMETER | SYMBOL | CONDITION | XOSM-572 |
| Frequency Range | F_O | | 1 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 2.5 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.000 MHz to 23.999 MHz | 12 mA Max |
| | | 24.000 MHz to 49.999 MHz | 15 mA Max |
| | | 50.000 MHz to 69.999 MHz | 20 mA Max |
| | | 70.000 MHz to 100.000 MHz | 30 mA Max |
| Output Symmetry | Sym | At $\frac{1}{2} V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 7 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 7 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L.... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 μ F bypass capacitor should be placed between V_{DD} (Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

| XOSM-572 | B | R | E | 50 M | e4 |
|----------|--|--|-------------------------|---------------|-------------------------------|
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

GLOBAL PART NUMBER

| | | | | | | | | | | | | |
|-------|---|---|---|---------------------|---|-----|---------------------|---------|---|-----------|---|---|
| X | O | 2 | 7 | C | T | E | C | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE CODE | OPTIONS | | FREQUENCY | | |

Surface Mount Oscillator



The XOSM-571 series is an ultra miniature package clock oscillator with dimensions 7.0 x 5.0 x 1.5 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 1.8 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

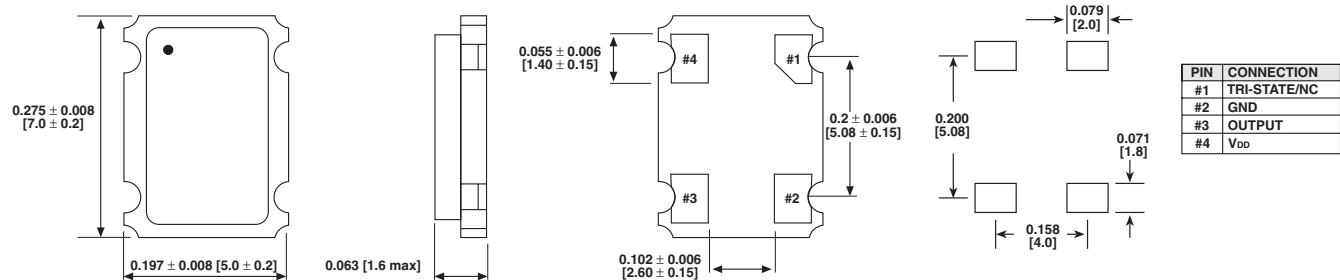


RoHS COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------------|---|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-571 |
| Frequency Range | F _O | | 1 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ±25 ppm, ±50 ppm, ±100 ppm |
| Operating Temperature | T _{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature | T _{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V _{DD} | | 1.8 V ± 10 % |
| Aging (First Year) | | 25 °C ± 3 °C | ±5 ppm |
| Supply Current | I _{DD} | 1.000 MHz to 23.999 MHz | 10 mA Max |
| | | 24.000 MHz to 49.999 MHz | 12 mA Max |
| | | 50.000 MHz to 69.999 MHz | 15 mA Max |
| | | 70.000 MHz to 100.000 MHz | 25 mA Max |
| Output Symmetry | Sym | At 1/2 V _{DD} | 40/60 % (45/5 % Option) |
| Rise Time | T _r | 10 % V _{DD} ~ 90 % V _{DD} | 6 nS Max |
| Fall Time | T _f | 90 % V _{DD} ~ 10 % V _{DD} | 6 nS Max |
| Output Voltage | V _{OH} | | 90 % V _{DD} Min |
| | V _{OL} | | 10 % V _{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max |
| Start-up Time | | T _s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 μF bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|----------------------|---|--|-------------------------|---------------|-------------------------------|
| XOSM-571 | B | R | E | 50 M | e4 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|---|-----|---------------------|-----------------|---|-----------|---|---|
| X | O | 1 | 7 | C | T | E | C | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | | OTR | ENABLE/DISABLE CODE | PACKAGE OPTIONS | | FREQUENCY | | |

Surface Mount Oscillator



The XOSM-533 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

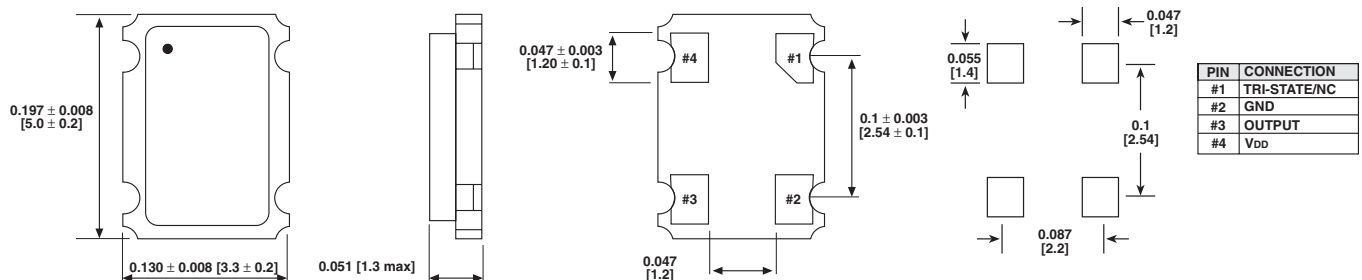
- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 3.3 V input voltage
- Lead (Pb)-free terminations and RoHS compliant



| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------------|---|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-533 |
| Frequency Range | F _O | | 1.544 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ±25 ppm, ±50 ppm, ±100 ppm |
| Operating Temperature | T _{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T _{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V _{DD} | | 3.3 V ± 10 % |
| Aging (First Year) | | 25 °C ± 3 °C | ±5 ppm |
| Supply Current | I _{DD} | 1.544 MHz to 9.999 MHz | 8 mA Max |
| | | 10.000 MHz to 34.999 MHz | 10 mA Max |
| | | 35.000 MHz to 49.999 MHz | 25 mA Max |
| | | 50.000 MHz to 100.000 MHz | 35 mA Max |
| Output Symmetry | Sym | At 1/2 V _{DD} | 40/60 % (45/55 % Option) |
| Rise Time | T _r | 10 % V _{DD} ~ 90 % V _{DD} | 7 nS Max |
| Fall Time | T _f | 90 % V _{DD} ~ 10 % V _{DD} | 7 nS Max |
| Output Voltage | V _{OH} | | 90 % V _{DD} Min |
| | V _{OL} | | 10 % V _{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max (15 pF typ.) |
| Start-up Time | | T _s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01µF bypass capacitor should be placed between V_{DD}(Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | | |
|----------------------|---|--|-------------------------|----------------|-----------------------|-----------|
| XOSM-533 | B | R | E | 50 M | e2 | |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead | |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | (Pb)-Free STANDARD | |
| GLOBAL PART NUMBER | | | | | | |
| X | O | 6 | 3 | C | T | E |
| | | | | | | A |
| | | | | | | N |
| | | | | | | A |
| | | | | | | 5 |
| | | | | | | 0 |
| | | | | | | M |
| MODEL | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODES | OPTIONS |
| | | | | | | FREQUENCY |

Surface Mount Oscillator



The XOSM-532 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 2.5 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

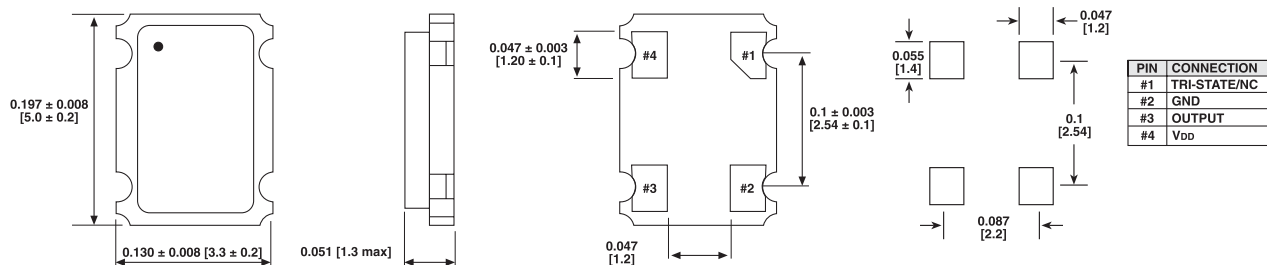


RoHS
COMPLIANT

| STANDARD ELECTRICAL SPECIFICATIONS | | | |
|------------------------------------|------------|-------------------------------|--|
| PARAMETER | SYMBOL | CONDITION | XOSM-532 |
| Frequency Range | F_O | | 1.544 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 2.5 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.544 MHz to 9.999 MHz | 7 mA Max |
| | | 10.000 MHz to 34.999 MHz | 8 mA Max |
| | | 35.000 MHz to 49.999 MHz | 20 mA Max |
| | | 50.000 MHz to 100.000 MHz | 30 mA Max |
| Output Symmetry | Sym | At $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 6 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 6 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max (15 pF typ.) |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 μ F bypass capacitor should be placed between V_{DD} (Pin4) and GND(Pin2) to minimize power supply line noise

| ORDERING INFORMATION | | | | | |
|----------------------|---|--|-------------------------|---------------|-------------------------------|
| XOSM-532 | B | R | E | 50 M | e4 |
| MODEL | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | FREQUENCY/MHz | JEDEC Lead (Pb)-Free STANDARD |
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

| GLOBAL PART NUMBER | | | | | | | | | | | | |
|--------------------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 6 | 2 | C | T | E | A | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

Surface Mount Oscillators



The XOSM-531 series is an ultra miniature package clock oscillator with dimensions 5.0 x 3.2 x 1.3 mm. It is mainly used in portable PC and telecommunication devices and equipment.

FEATURES

- 5 x 3.2 x 1.3 Miniature Package
- Tri-state enable/disable
- HCMOS compatible
- Tape and Reel
- IR Re-flow
- 1.8 V input voltage
- 100 % Lead (Pb)-free and RoHS compliant

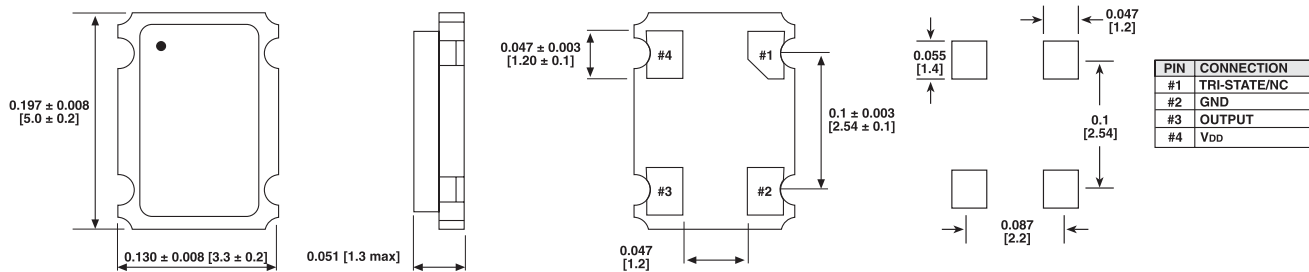

RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | XOSM-531 |
|---------------------------|------------|-------------------------------|--|
| Frequency Range | F_o | | 1.544 MHz ~ 100.000 MHz |
| Frequency Stability* | | All Condition* | ± 25 ppm, ± 50 ppm, ± 100 ppm |
| Operating Temperature | T_{OPR} | | 0 °C ~ 70 °C (-40 °C ~ +85 °C option) |
| Storage Temperature Range | T_{STG} | | -55 °C ~ +125 °C |
| Power Supply Voltage | V_{DD} | | 1.8 V \pm 10 % |
| Aging (First Year) | | 25 °C \pm 3 °C | ± 5 ppm |
| Supply Current | I_{DD} | 1.544 MHz to 9.999 MHz | 6 mA Max |
| | | 10.000 MHz to 34.999 MHz | 7 mA Max |
| | | 35.000 MHz to 49.999 MHz | 15 mA Max |
| | | 50.000 MHz to 100.000 MHz | 25 mA Max |
| Output Symmetry | Sym | At $1/2 V_{DD}$ | 40/60 % (45/55 % Option) |
| Rise Time | T_r | 10 % V_{DD} ~ 90 % V_{DD} | 5 nS Max |
| Fall Time | T_f | 90 % V_{DD} ~ 10 % V_{DD} | 5 nS Max |
| Output Voltage | V_{OH} | | 90 % V_{DD} Min |
| | V_{OL} | | 10 % V_{DD} Max |
| Output Load | HCMOS Load | | 30 pF Max (15 pF typ.) |
| Start-up Time | | T_s | 10 mS Max |
| Pin 1, tri-state function | | | Pin 1 = H or open.... output active at pin 3 Pin 1 = L..... high impedance at pin 3 |

*Include: 25 °C tolerance, operating temperature range, input voltage change, aging, load change, shock and vibration.

DIMENSIONS in inches [millimeters]



***note: A 0.01 μ F bypass capacitor should be placed between VDD(Pin4) and GND(Pin2) to minimize power supply line noise

ORDERING INFORMATION

| XOSM-531 MODEL | B FREQUENCY STABILITY | R OTR | E ENABLE/DISABLE | 50 M FREQUENCY/MHZ | e4 JEDEC Lead (Pb)-Free STANDARD |
|----------------|--|--|-------------------------|--------------------|----------------------------------|
| | AA = 0.0025 % (25 ppm) A = 0.005 % (50 ppm) B = 0.01 % (100 ppm) Standard | Blank = Standard R = -40 °C to +85 °C | E = Disable to Tristate | | |

GLOBAL PART NUMBER

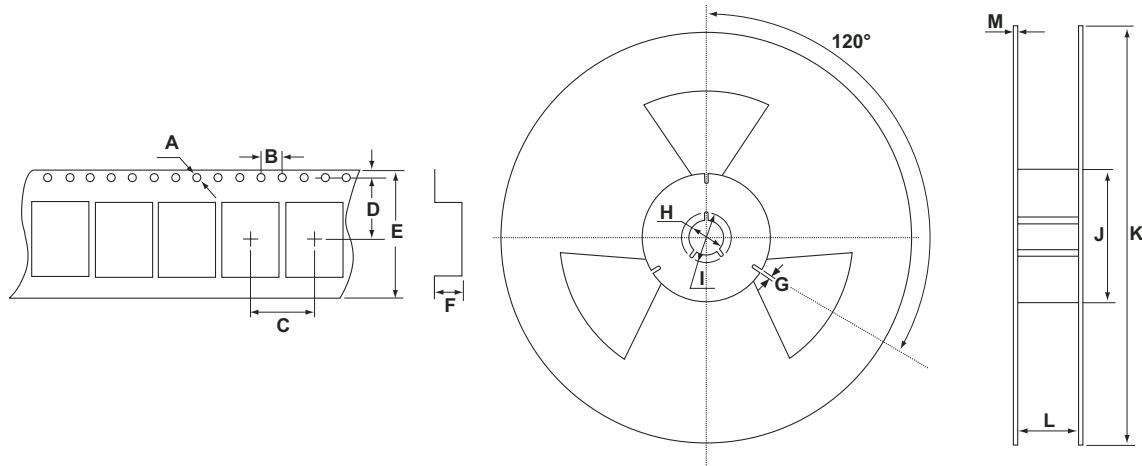
| | | | | | | | | | | | | |
|-------|---|---|---|---------------------|-----|----------------|--------------|---------|---|-----------|---|---|
| X | O | 6 | 1 | C | T | E | A | N | A | 5 | 0 | M |
| MODEL | | | | FREQUENCY STABILITY | OTR | ENABLE/DISABLE | PACKAGE CODE | OPTIONS | | FREQUENCY | | |

Tubes

| PACKAGING SPECIFICATIONS in inches (millimeters) | | | | | | | | | | |
|--|-------|----------------|-----------------|-----------------|----------------|-----------------|----------------|----------------|------------------|----------|
| <p>Style A</p> | | | | | | | | | | |
| <p>Style B</p> | | | | | | | | | | |
| P/N | STYLE | A | B | C | D | E | F | G | L | QTY/TUBE |
| XO-53 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 25 |
| XO-54 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 25 |
| XO-543 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 25 |
| XO-52 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 40 |
| XO-523 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 40 |
| XO-56 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 25 |
| XOVC-23 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 25 |
| XOSM-52 | A | 0.031 [0.8] | 0.433 [11.0] | 0.622 [15.8] | 0.177 [4.5] | 0.531 [13.5] | 0.339 [8.6] | 0.087 [2.2] | 20.08 [510.0] | 40 |
| XOSM-57 | B | 0.024 [0.6] | 0.26 [6.6] | 0.094 [2.4] | 0.098 [2.5] | 0.079 [2.0] | – | – | 15.16 [385.0] | 50 |
| XOSM-573 | B | 0.024 [0.6] | 0.26 [6.6] | 0.094 [2.4] | 0.098 [2.5] | 0.079 [2.0] | – | – | 15.16 [385.0] | 50 |

Surface Mount Tape and Reel

TAPE AND REEL SPECIFICATIONS in inches (millimeters)



TAPE SPECIFICATIONS

| MODEL | A | B | C | D | E | F | QTY/REEL |
|---------------------|----------------|-------------|--------------|--------------|--------------|--------------|----------|
| XT32P | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.154 (3.9) | 1000 |
| XT38P | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.106 (2.7) | 1000 |
| XT49M | Ø 0.059 (1.50) | 0.157 (4.0) | 0.472 (12.0) | 0.453 (11.5) | 0.945 (24.0) | 0.171 (4.35) | 1000 |
| XT49ML | Ø 0.059 (1.50) | 0.157 (4.0) | 0.472 (12.0) | 0.453 (11.5) | 0.945 (24.0) | 0.138 (3.5) | 1000 |
| XT46C | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.059 (1.5) | 1000 |
| XT57C | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.079 (2.0) | 1000 |
| XT36C | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.079 (2.0) | 1000 |
| XOSM-57/573/572/571 | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.295 (7.5) | 0.630 (16.0) | 0.079 (2.0) | 1000 |
| XOSM-533/532/531 | Ø 0.059 (1.50) | 0.157 (4.0) | 0.315 (8.0) | 0.217 (5.5) | 0.472 (12.0) | 0.059 (1.5) | 1000 |

REEL SPECIFICATIONS

| MODEL | G | H | I | J | K | L | M |
|---------------------|-------------|----------------|--------------|--------------|-------------|--------------|-------------|
| XT32P | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 3.917 (99.5) | 12.99 (330) | 0.630 (16.0) | 0.091 (2.3) |
| XT38P | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 3.917 (99.5) | 12.99 (330) | 0.630 (16.0) | 0.091 (2.3) |
| XT49M | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 3.917 (99.5) | 12.99 (330) | 0.945 (24.0) | 0.091 (2.3) |
| XT49ML | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 3.917 (99.5) | 12.99 (330) | 0.945 (24.0) | 0.091 (2.3) |
| XT46C | 0.091 (2.3) | Ø 0.531 (13.5) | 0.850 (21.6) | 2.362 (60.0) | 7.008 (178) | 0.630 (16.0) | 0.056 (1.4) |
| XT57C | 0.091 (2.3) | Ø 0.531 (13.5) | 0.850 (21.6) | 2.362 (60.0) | 7.008 (178) | 0.630 (16.0) | 0.056 (1.4) |
| XT36C | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 2.362 (60.0) | 7.008 (178) | 0.689 (17.5) | 0.056 (1.4) |
| XOSM-57/573/572/571 | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 2.362 (60.0) | 7.008 (178) | 0.689 (17.5) | 0.056 (1.4) |
| XOSM-533/532/531 | 0.098 (2.5) | Ø 0.531 (13.5) | 0.850 (21.6) | 2.362 (60.0) | 7.008 (178) | 0.531 (13.5) | 0.056 (1.4) |

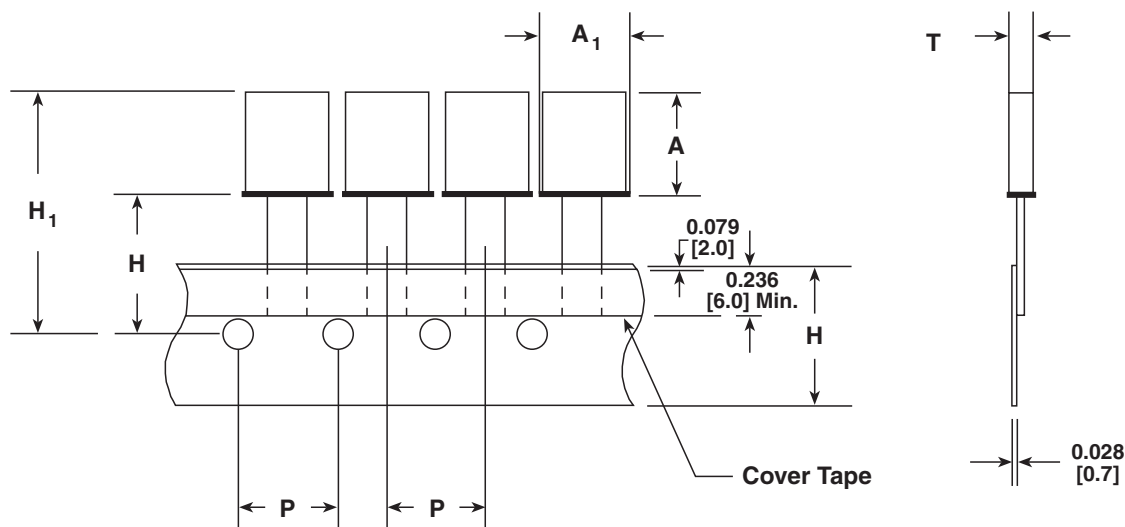
Packaging Specifications

Vishay Dale

Radial Lead Tape and Reel

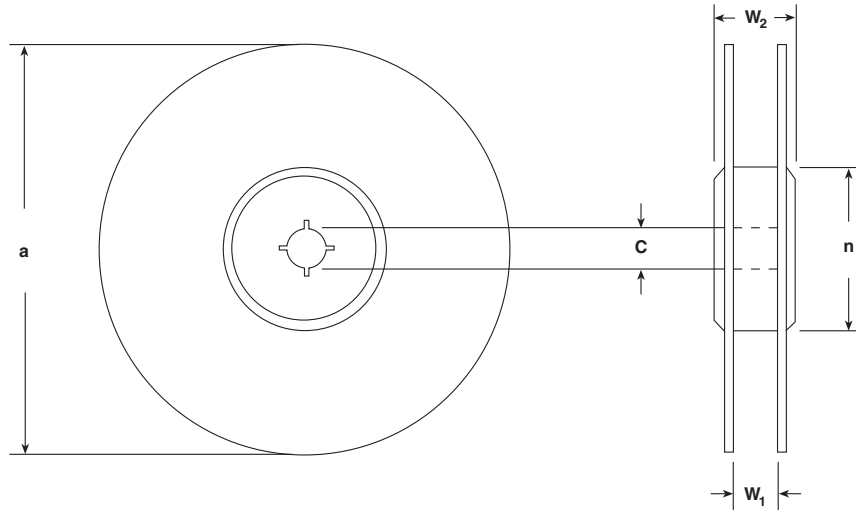


PACKAGING SPECIFICATIONS in inches (millimeters)



| P/N | A | A ₁ | H | H ₁ | P | T |
|-------|-----------------|-----------------|-----------------|----------------------|-----------------|---------------------|
| XT49S | 0.146 [3.7] | 0.453 [11.5] | 0.709 [18.0] | 0.945 [24.0] Max. | 0.500 [12.7] | 0.197 [5.0] Max. |
| XT49U | 0.524 [13.3] | 0.441 [11.2] | 0.709 [18.0] | 1.32 [33.6] Max. | 0.500 [12.7] | 0.197 [5.0] Max. |
| XTUM1 | 0.323 [8.2] | 0.354 [9.0] | 0.709 [18.0] | 1.12 [28.5] Max. | 0.500 [12.7] | 0.197 [5.0] Max. |

PACKAGING SPECIFICATIONS in inches (millimeters)



| P/N | a | C | n | W ₁ | W ₂ | QTY/REEL |
|-------|-----------------------|---------------------|---------------------|---------------------|---------------------|----------|
| XT49S | 14.57 [370.0] Max. | 1.50 [38.0] Max. | 3.15 [80.0] Max. | 1.36 [34.5] Max. | 2.20 [56.0] Max. | 1000 |
| XT49U | 14.57 [370.0] Max. | 1.50 [38.0] Max. | 3.15 [80.0] Max. | 1.73 [44.0] Max. | 2.20 [56.0] Max. | 1000 |
| XTUM1 | 14.57 [370.0] Max. | 1.50 [38.0] Max. | 3.15 [80.0] Max. | 1.54 [39.0] Max. | 2.20 [56.0] Max. | 1000 |

Crystals and Oscillators Packaging Methods

| TAPE AND REEL in inches [millimeters] | | | | | | | | | | | |
|--|--------------|----------|-----------|--------------------|-----------------|------------------------|----------------|--------------|----------|------------------------|----------------|
| MODEL | PACKAGE CODE | SAP CODE | REEL SIZE | CARRIER TAPE WIDTH | COMPONENT PITCH | MINIMUM ORDER QUANTITY | ORDER MULTIPLE | PACKAGE CODE | SAP CODE | MINIMUM ORDER QUANTITY | ORDER MULTIPLE |
| XT26T | - | - | - | - | - | - | - | B04 | A | 1000 | 100 |
| XT38T | - | - | - | - | - | - | - | B04 | A | 1000 | 100 |
| XT38P | RC6 | F | 13 | 0.630 [16.0] | 0.315 [8.0] | 3000 | 3000 | B04 | A | 200 | 100 |
| XT32P | RF6 | M | 13 | 0.630 [16.0] | 0.315 [8.0] | 2000 | 2000 | B04 | A | 200 | 100 |
| XT49U | RF5 | G | 14.57 | 0.709 [18.0] | 0.500 [12.7] | 1000 | 1000 | B04 | A | 500 | 100 |
| XT49S | RF5 | G | 14.57 | 0.709 [18.0] | 0.500 [12.7] | 1000 | 1000 | B04 | A | 500 | 100 |
| XT49SL | RF5 | G | 14.57 | 0.709 [18.0] | 0.500 [12.7] | 1000 | 1000 | B04 | A | 500 | 100 |
| XT49M | RF7 | H | 13 | 0.087 [2.2] | 0.531 [13.5] | 1000 | 1000 | B04 | A | 500 | 100 |
| XT49ML | RF7 | H | 7 | 0.087 [2.2] | 0.531 [13.5] | 1000 | 1000 | B04 | A | 500 | 100 |
| XT36C | RF7 | H | 7 | 0.630 [16.0] | 0.315 [8.0] | 1000 | 1000 | B04 | A | 100 | 100 |
| XT57C | RF7 | H | 7 | 0.087 [2.2] | 0.531 [13.5] | 1000 | 1000 | B04 | A | 100 | 100 |
| XT46C | RF7 | H | 7 | 0.087 [2.2] | 0.531 [13.5] | 1000 | 1000 | B04 | A | 100 | 100 |
| XO-53 | - | - | - | - | - | - | - | D07 | D | 100 | 25 |
| XO-54 | - | - | - | - | - | - | - | D07 | D | 100 | 25 |
| XO-543 | - | - | - | - | - | - | - | D07 | D | 100 | 25 |
| XO-52 | - | - | - | - | - | - | - | D08 | L | 120 | 40 |
| XO-523 | - | - | - | - | - | - | - | D08 | L | 120 | 40 |
| XO-56 | - | - | - | - | - | - | - | D07 | D | 1000 | 25 |
| XOVC-23 | - | - | - | - | - | - | - | D07 | D | 100 | 25 |
| XOSM-52 | - | - | - | - | - | - | - | D08 | L | 120 | 40 |
| XOSM-55 | RF7 | H | 13 | 0.945 [24.0] | 0.472 [12.0] | 1000 | 1000 | D07 | D | 100 | 25 |
| XOSM-553 | RF7 | H | 13 | 0.945 [24.0] | 0.472 [12.0] | 1000 | 1000 | D07 | D | 100 | 25 |
| XOSM-57 | RF7 | H | 7 | 0.630 [16.0] | 0.315 [8.0] | 1000 | 1000 | D06 | C | 100 | 50 |
| XOSM-573 | RF7 | H | 7 | 0.630 [16.0] | 0.315 [8.0] | 1000 | 1000 | D06 | C | 100 | 50 |
| XOSM-572 | RF7 | H | 7 | 0.630 [16.0] | 0.315 [8.0] | 1000 | 1000 | D06 | C | 100 | 50 |
| XOSM-571 | RF7 | H | 7 | 0.630 [16.0] | 0.315 [8.0] | 1000 | 1000 | D06 | C | 100 | 50 |
| XOSM-533 | RF7 | H | 7 | 0.472 [12.0] | 0.315 [8.0] | 1000 | 1000 | B04 | A | 100 | 100 |
| XOSM-532 | RF7 | H | 7 | 0.472 [12.0] | 0.315 [8.0] | 1000 | 1000 | B04 | A | 100 | 100 |
| XOSM-531 | RF7 | H | 7 | 0.472 [12.0] | 0.315 [8.0] | 1000 | 1000 | B04 | A | 100 | 100 |



Environmental and Mechanical Specifications

| ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS | | |
|---|--|--------------------------------------|
| DESCRIPTION | LIMITS/CONDITIONS | TEST PROCEDURES |
| Thermal Cycle | - 55° C, + 85° C, 5 cycles | MIL-STD-202, Method 107, Condition A |
| Gross Leak test | All units 100 % leak tested | MIL-STD-202, Method 112, Condition D |
| Fine Leak | Mass spectrometer leak rate less than 2×10^{-8} Atm. cc/sec of helium | MIL-STD-202, Method, Condition C |
| Moisture Resistance | 95 % RH, + 25° to + 65° C, 10 cycles | MIL-STD-202, Method 106 |
| Shock | 1000g, 0.35 mS | MIL-STD-202, Method 213, Condition I |
| Vibration | 10 - 55Hz, 0.06" D.A., 55 - 2000Hz, 20g | MIL-STD-202, Method 204, Condition D |
| Solderability | Minimum 95 % coverage | MIL-STD-202, Method 208 |
| Resistance to Solvents | Isopropyl alcohol, terpene and monethanolamine solutions | MIL-STD-202, Method 215 |

TEST CIRCUITS

TTL

The TTL test circuit diagram shows a power supply of +5.0 V/3.3 V connected to an ammeter (A) and a voltmeter (V). A 0.01 μF capacitor is connected between the supply and ground. The Vcc pin of the device is connected to the supply, and the Gnd pin is connected to ground. The Output pin is connected to a Test Point. A dashed box labeled 'TTL Load' contains a resistor (RL = 390 ohms for 10 TTL) and a capacitor (CL = 15 pF) connected to ground.

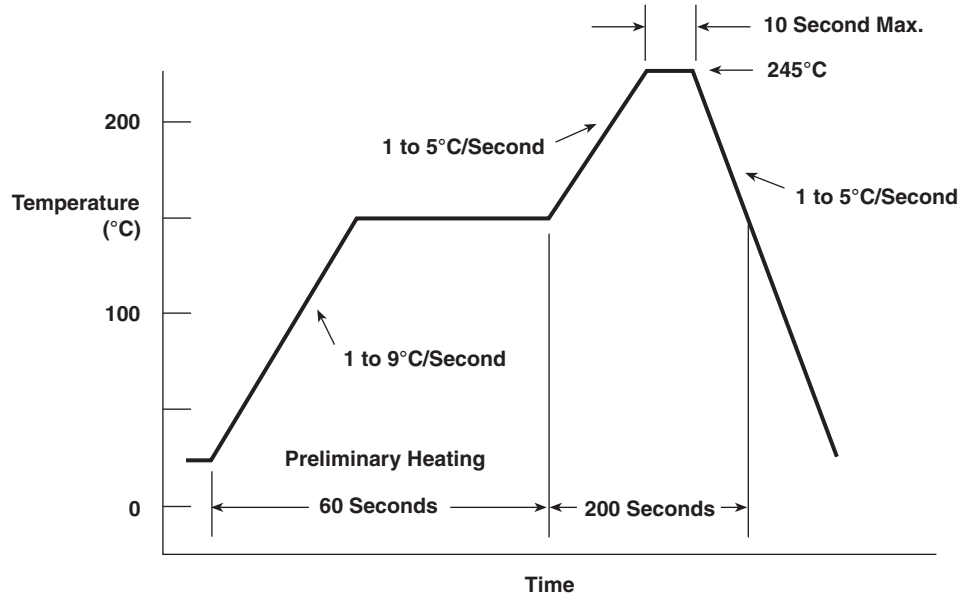
HCMOS

The HCMOS test circuit diagram shows a power supply of +5.0 V/3.3 V connected to an ammeter (A) and a voltmeter (V). A 0.01 μF capacitor is connected between the supply and ground. The Vcc pin of the device is connected to the supply, and the Gnd pin is connected to ground. The Output pin is connected to a Test Point. A dashed box labeled 'HCMOS Load' contains a capacitor (CL = 50 pF or 15 pF) connected to ground.

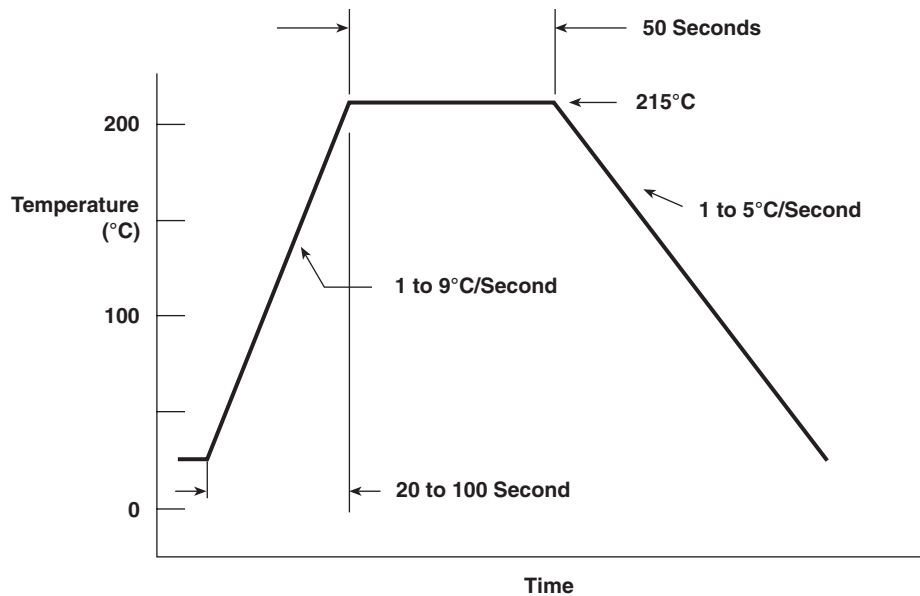
Soldering Profiles

RECOMMENDED PROFILES FOR SOLDER REFLOW

Infrared Reflow



Vapor Phase Reflow



CROSS REFERENCE - CRYSTALS AND OSCILLATORS

| VISHAY P/N | ABRACON | AVX KYOCERA | CTS | ECS | ECLIPTEK | EPSON | FOX | M-TRON | PLETRONICS | RALTRON | RXD | SARONIX | VALPEY |
|------------|---------|----------------|----------|-----------|------------|--------------|----------------|------------|------------|---------|-----------------|-------------------|-----------|
| XT126T | AB26T | KF-26G-12P0200 | — | ECS-2X6 | EC26T | C-002RX 12.5 | NC26 | MMCC-2 | WX26 | R26 | WC-26E | NTF 3226 | NC26 |
| XT138T | AB38T | KF-38G-12P0200 | — | ECS-3X8 | EC38T | C-001R 12.5 | NC38 | MMCC-1 | WX | R38 | WC-38E | NTF 3238 | NC38 |
| XT149S | ABL | — | ATS | — | EC2 | — | HC49S | ATS-49 | LP49 | AS | MP35 | 49S | VM6S |
| XT149U | AB | — | MP | — | EC OR 8EC | — | HC49U | MP-1SRMP-1 | MP49 | A | MP49 | NMP /NYP | VM6 |
| XTUM1 | ABU | — | — | — | ECUM | — | UM1 | UM-1 | UM1 | — | — | UM1 | UM1 |
| XT32PA | — | — | — | — | ECP3M310T | MC-406 | — | — | — | — | — | 32S12A | VFSMC-2 |
| XT32PB | — | — | — | — | — | MC-405 | FSM327 | — | — | — | — | 32S12B | VFSMC-1 |
| XT38PA | — | — | — | — | ECP3M 29 T | MC306 | FSR327 | SX1555 | SM20S | — | — | 32S12C | — |
| XT46C | ECCM5 | KSX-36 | — | ECX-64 | — | FA368 | FM | PP | SM12H | — | — | NKS6 | — |
| XT49M | ABLS | — | ATS-SM | — | EC2SM | — | HC49SD | ATSM-49 | SM42 | AS-SMD | MP35L | 49SMLB | VM6SSM-2 |
| XT36C | ABM5 | — | — | — | — | — | — | PX | — | H180A | — | — | — |
| XT157C | ABMM | — | SMLP | — | — | — | FD | — | — | H13K | — | NKS 7 | VFSXG-2 |
| XO-52B | ACH | KHO-HC1CS | MXO45HS | ECS-2100 | EC1100HS | — | — | MH13FAD | SQ2200 | CO12100 | HHSC2 OR HTHSC2 | NCH 039/069/089 C | VF70 |
| XO-52BE | ACHA | KHO-HC1CSE | MXO45HST | ECS-2200 | EC100HSTS | *SG531 | H5C-2 OR F3020 | MH13EAD | SQ3300 | CO19100 | NNSCR2 OR HRC2 | NTH 039/069/089 C | VF70T |
| XO-523B | — | — | — | — | EC1300HS | — | — | — | SQ2200V | — | — | — | — |
| XO-523BE | — | — | — | — | EC1300HST | — | — | — | SQ3300V | — | — | — | — |
| XO-53B | — | KXO-01-1 | MXO45 | ECS 100A | — | — | F1100E | MT013FAD | — | CO1100 | T2 | NCT 040/050/070 C | VF150 |
| XO-53BE | — | — | MXO45T | — | — | *SG51 | F100HT | MT013EAD | — | — | — | NTT 040/050/070 C | VF150T |
| XO-54B | ACO | KXO-HC 1CS | — | ECS 400A | EC1100 | — | F5C | MHO-13FAD | P1100-HC | CO6100 | HSC2 OR THSC2 | NCH 030/060/080 C | VF140 |
| XO-54BE | ACOA | KHO-HC 1CSE | — | ECS 1000E | EC1100TS | — | F5C-2 OR F3000 | MHO-13EAD | P1100-3SV | CO15100 | HSCR2 OR RC2 | NTH 030/060/080 C | VF140T |
| XO-543B | — | — | — | — | EC1300 | — | — | — | P1100-HCV | — | — | — | — |
| XO-543BE | — | — | — | — | EC1300TS | — | — | — | P1100-3SV | — | — | — | — |
| XOVC-23 | — | — | — | — | EC3100 | — | VCO-B | MV1 | VC-1 | VC 7025 | — | — | — |
| XOSM-55 | ASMA | — | — | ECS-9F | EC1400SJTS | SG615P | F5O-2 | MHR13TAJ | SM1100C | CO66610 | — | NTH 03/06/08 HC | — |
| XOSM-553 | — | — | — | — | EC1500SST | — | — | — | — | CO63100 | — | NTH 03/06/08 HC3 | — |
| XOSM-57BE | ASLA | K50-HC 1 CS E | CB3-2C | ECS-3951C | EC2500TS | — | F3345 OR F3355 | M113TAN | SM7700H | CO4910 | — | S1700C OR 1750C | VF1 / VF5 |
| XOSM-573BE | ASVA | K50-3C1E | CB3LV-2C | ECS-3953C | EC2600TS | — | F4100 | M213TAN | — | CO4310 | — | S1703C | VF3 |
| XOSM-572 | — | K53-2C | CB2V5 | ECS-5725 | EC2700TS | — | F4400 | M2250 | — | — | — | S1614 | — |
| XOSM-571 | — | K53-1C | CB1V8 | ECS-5718 | EC2900TS | — | F4500 | M2180 | — | CO418 | — | S1612 | — |
| XOSM-533 | ASFLP | FXO-61F2 | 636L | ECS-3963 | EC3600TS | — | F530L | M2034 | — | COM23 | — | S1633 | G3 |
| XOSM-532 | ASFL2 | — | 636N | ECS-3525 | EC3700TS | — | F540L | — | — | — | — | S1634 | — |
| XOSM-5531 | ASFL3 | — | 636M | ECS-3518 | EC3900TS | — | F510L | — | — | — | — | — | — |

*The Vishay product is pin compatible in a metal can. The SG-51 and SG531 are in a molded package.

NOTE: The above cross reference is the suggested substitute for key competitors part numbers. Vishay does not accept any responsibility for any errors that result from this cross reference. Please contact factory for other crosses.















ONLINE INFORMATION

For product information and current list of sales offices,
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